

# Mammals in the Royal Natural History Museum, Stockholm, Collected in Brazil and Bolivia by A. M. Olalla during 1934-1938

Bruce D. Patterson

---

## Abstract

During the 1930s, A. M. Olalla assembled extraordinary collections of mammals from various parts of Brazil and Bolivia. Several important collections dating from this period were purchased by Nils Gyldenstolpe of the Royal Natural History Museum, Stockholm, but the collections were never identified, nor were records ever published. These collections present a large number of new locality records, several remarkable range extensions, a number of very poorly known species, and three apparently undescribed species (one bat, two rodents). Formal description of the new forms is deferred until revisions of *Tonatia* and *Oxymycterus* are completed. Field observations document several novel roosting habits of bats and foraging sites for certain quadrupeds. Lists of species taken at different sites offer new information on syntopic assemblages of mammals in different lowland and highland sites.

## Introduction

Alfonso M. Olalla ranks as one of the most prolific scientific collectors of mammals in the history of South America. During the course of his career, which extended from the 1930s into the 1960s, he collected in several countries for many different museums. Initially based in Ecuador with his father Carlos and brothers Manuel, Ramón, and Rosalino (Emmons, 1988), Alphonso subsequently moved to Brazil. Large series of his mammal specimens are found in collections in New York (American Museum of Natural History), Chicago (Field Museum of Natural History), and Stockholm (Royal Natural History Museum [Naturhistoriska Riksmuseet]), as well as in São Paulo (Museu de Zoologia, Universidade de São Paulo), where Olalla made his final home. Smaller series are found in numerous other collections.

During the 1930s, Olalla was engaged to make several collections of birds and mammals for the Royal Natural History Museum of Sweden. Specimens were collected by a team consisting of Olalla, his wife (Dr. Nair V. Olalla), and several trained assistants. Using funds granted by the Knut and Alice Wallenberg Foundation, Nils Gyldenstolpe, curator of vertebrates at the Swedish museum, purchased about 13,000 birds and 2000 mammals

from Olalla between the years 1935 and 1937. Most of the specimens were obtained in the Brazilian states of Pará and Amazonas. However, at Gyldenstolpe's request, a special expedition was undertaken in 1936 to the Upper Rio Juruá, including portions of the Rio Purus drainage (Olalla, 1937; Gyldenstolpe, 1941a). In 1937, another expedition by Olalla was organized, under the same funding arrangements, to sample the Beni drainage and yungas and highlands of Bolivia. About 9000 birds and 400 mammals were collected during this expedition, whose travails resulted in the death of one expedition member (Gyldenstolpe, 1941b).

These collections were especially valuable because they included a rich diversity of forms from numerous remote localities and were accompanied by excellent field documentation. Noteworthy bird records were reported by Gyldenstolpe (1941a,b) shortly after the collections arrived in Stockholm. More detailed and comprehensive reports were postponed by the Second World War. Subsequently, Gyldenstolpe published definitive works on the birds of the Rio Juruá (1945a), birds of northern Bolivia (1945b), and birds of the Rio Purus region (1951). Each of these works included detailed descriptions of Olalla's collecting sites, his itinerary during the expeditions, and accounts of camp life. However, ambitions to publish parallel

works on the mammal collections were never realized. Thus, these collections of marsupials, bats, and rodents remained uncatalogued and unidentified until the early 1980s. Then, Philip Hershkovitz, Emeritus Curator of Mammals at the Field Museum in Chicago, encountered this material during the course of his primate studies in Stockholm. Hershkovitz arranged with Curator Bo Svenson for the entire collection to be shipped to Chicago for study.

Upon identification, the collections proved to be rich in species, three of them apparently new, and presented many valuable new distributional and ecological records. These records gain special importance in view of current interest in delimiting areas of high conservation priority in the Amazon Basin (Rylands, 1990). Taxonomic and locality records from this collection are summarized here to call them to the attention of systematists and ecologists engaged in more synthetic efforts. The new taxa are to be described elsewhere so that they may be treated phylogenetically, rather than simply as taxonomic novelties.

A few words about Olalla's localities and habitat notes are perhaps in order. Rivers serve as corridors for access to the remote reaches of the Amazon Basin, and constitute primary barriers to the distribution of terrestrial fauna. Thus, rivers are associated with each place name, the bank of the river indicated by "left" or "right," with the observer facing downstream. *Igarapé* is a Tupi Indian word for stream, creek, or bayou. *Igapô* is of similar extraction, and is used to denote seasonally flooded forest along river margins that is no more than 5 m above low water level and hence is almost invariably swampy. *Várzea* refers to higher seasonally flooded forest along rivers, typically growing on past river deposits. Finally, *terra firme* forest grows on land above the reach of the highest floods, which may be 15–20 m higher than low water mark along many Amazonian tributaries.

## Data and Measurements

Data on provenance, date of collection, and sex, and, occasionally, reproductive, behavioral, and ecological notes were recorded in the field on specimen tags by A. M. Olalla (in rare cases by his assistants). Olalla also recorded three external variables (in mm): TOTL (total length, head and body plus tail), TAIL (tail length), and FOOT (typ-

ically right hind foot, including nails or claws). Length of the ear pinnae and weight were not recorded, nor were detailed aspects of reproductive anatomy and condition. Ecological notes are included in species accounts wherever available. Dates of collection are included for many series of bats, as Olalla collected bats mainly from roost sites (i.e., without the use of mist nets). Associations of males and females by date may help to identify important social and behavioral traits of these species.

Additional measurements were taken from preserved specimens. Forearm measurements (FA) of bats were taken from dried specimens with a ruler and therefore represent chordal lengths. Skulls and jaws were measured with digital calipers connected to a personal computer running INCAL software, developed by J. L. Russo (OIRM, Smithsonian Institution). Standard cranial measurements were used to describe general size and shape variation in each group, many taken from Hall (1946) but all described below. Inevitably, these lack the taxonomic specificity needed to resolve certain questions of relationships. For marsupials and rodents, the cranial measurements were

GLS	greatest skull length—distance from occipital condyles or supraoccipital bone to nasals or premaxillae, depending on taxon.
CIL	condyloincisive length—distance from anterior surface of incisors to posterior edges of occipital condyles.
NL	nasal length—distance from anteriormost point of nasals to posteriormost point of frontonasal suture.
ZB	zygomatic breadth—greatest distance across left and right zygomatic arches.
IOB	least interorbital breadth—smallest distance between inner margins of orbits, in some taxa corresponding to postorbital breadth.
BCW	braincase width—width of cranium at level of squamosal root of zygomatic arch.
CD	cranial depth—distance between highest point on cranium and a plane formed by incisors or canines with auditory bullae (using glass slide as platform and subtracting thickness of slide).
PTL	palatilar length—distance from posterior margins of incisive alveoli to posterior margin of palate.
MTR	length of maxillary molar tooththrow—

length from anterior margin of alveolus of anteriormost cheek tooth to posterior margin of alveolus of last molar.

For echimyid rodents, two additional measurements were taken, following Patton and Rogers (1983):

**ROSL** rostral length—chordal distance from anterior tip of nasal to notch formed by anterior edge of lacrimal and maxillary bones.

**PLB** palatal length "B"—distance between anterior margin of alveolus of P<sup>4</sup> and anterior margin of postpalatal notch.

For bats, variables GLS, CIL, ZB, IOB, BCW, and CD were measured as described above, and five additional measurements were taken:

**MAST** mastoid breadth—distance between outer margins of left and right mastoid bones.

**PAL** palatal length—distance from anterior margin of the incisors (rather than premaxillae, which were often damaged) to posterior margin of palate.

**GMB** greatest breadth across molars—distance between labial margins of paired molars, either M<sup>1</sup>–M<sup>1</sup> or M<sup>2</sup>–M<sup>2</sup>, depending on taxon.

**UTR** upper tooth row—distance from anterior margin of alveolus of incisors to posterior margin of alveolus of last molar.

**MNTR** mandibular tooth row—distance from anterior alveolus of first incisor to posterior margin of alveolus of last molar.

Aging criteria varied with taxon. For bats and marsupials, degrees of closure of the basioccipital–basisphenoid and supraoccipital–exoccipital sutures were used (open = 1, closed = 2, broadly fused = 3), with scores for the two sutures and the left and right sides summed to form a numerical age score ranging from 2 to 6. Specimens of *Proechimys* were aged according to the scheme of Patton and Rogers (1983) into 10 classes, with classes 8–10 being considered as "adult." Other echimyid rodents were segregated into the nine age classes of Patton and Emmons (1985), with classes 5–9 considered as "adult." Age classes of *Akodon* were evaluated using the six tooth-wear categories of Feito et al. (1981), whereas all other murids and squirrels were categorized by a coarser tooth-wear scheme: (1) unworn—incomplete tooth eruption or teeth at occlusal level but slightly or not at all

worn; (2) worn—cusps of all teeth showing some degree of wear; (3) heavily worn—cusps of all teeth virtually obliterated, crowns of posterior molars often appearing as shallow dishes.

In the subsequent species accounts, the following information is given for each age and measurement: sample size, minimum and maximum, mean, and (for sample sizes  $\geq 5$ ) coefficient of variation. Missing values are indicated by the symbol  $\phi$ .

## Gazetteer

A list of localities represented by specimens in these collections follows. Corrected spellings or modern names for localities are separated by brackets from information on the tags; also enclosed by brackets are ancillary coordinates, elevation, and habitat descriptions for the sites where these are available. Primary sources for the latter information are the ornithological accounts of Griscom and Greenway (1941) and Gyldenstolpe (1945a,b, 1951). Coordinates and elevations given for these sites are those in the ornithological gazetteers for Bolivia (Paynter and Traylor, 1975) and Brazil (Paynter and Traylor, 1991) because of the far greater accuracy of modern maps. An unpublished gazetteer card file for Neotropical mammals, assembled by P. Hershkovitz, was also useful in determining locality positions. Locality numbers are plotted in Figure 1.

## Bolivia

### Cochabamba

- 1) Cuesta Cucho [2300 m; 17°15'S, 65°45'W], 20–26 May 1938.
- 2) Illataco, 2600 m [17°20'S, 66°07'W; ca. 5 km NW of Cochabamba], 22–29 Dec 1938.
- 3) Liriuni, 3000 m [17°19'S, 66°20'W; on Monte Tunari], 20–23 Nov 1938.
- 4) Locotal [1850 m; 17°11'S, 65°48'W], 24–28 Apr 1938.
- 5) Toncoma, 3200 m [ca. 17°15'S, 66°20'W; about 50 km NW of Cochabamba], 3–11 Dec 1938.
- 6) Ucho Ucho, 3526 m [17°10'S, 66°20'W; about 30 km NW of Cochabamba], 16–19 Dec 1938.

COLLECTING LOCALITIES OF A. M. OLALLA

6 FEB 1934 - 29 DEC 1938

BOLIVIA & BRAZIL

1000 km

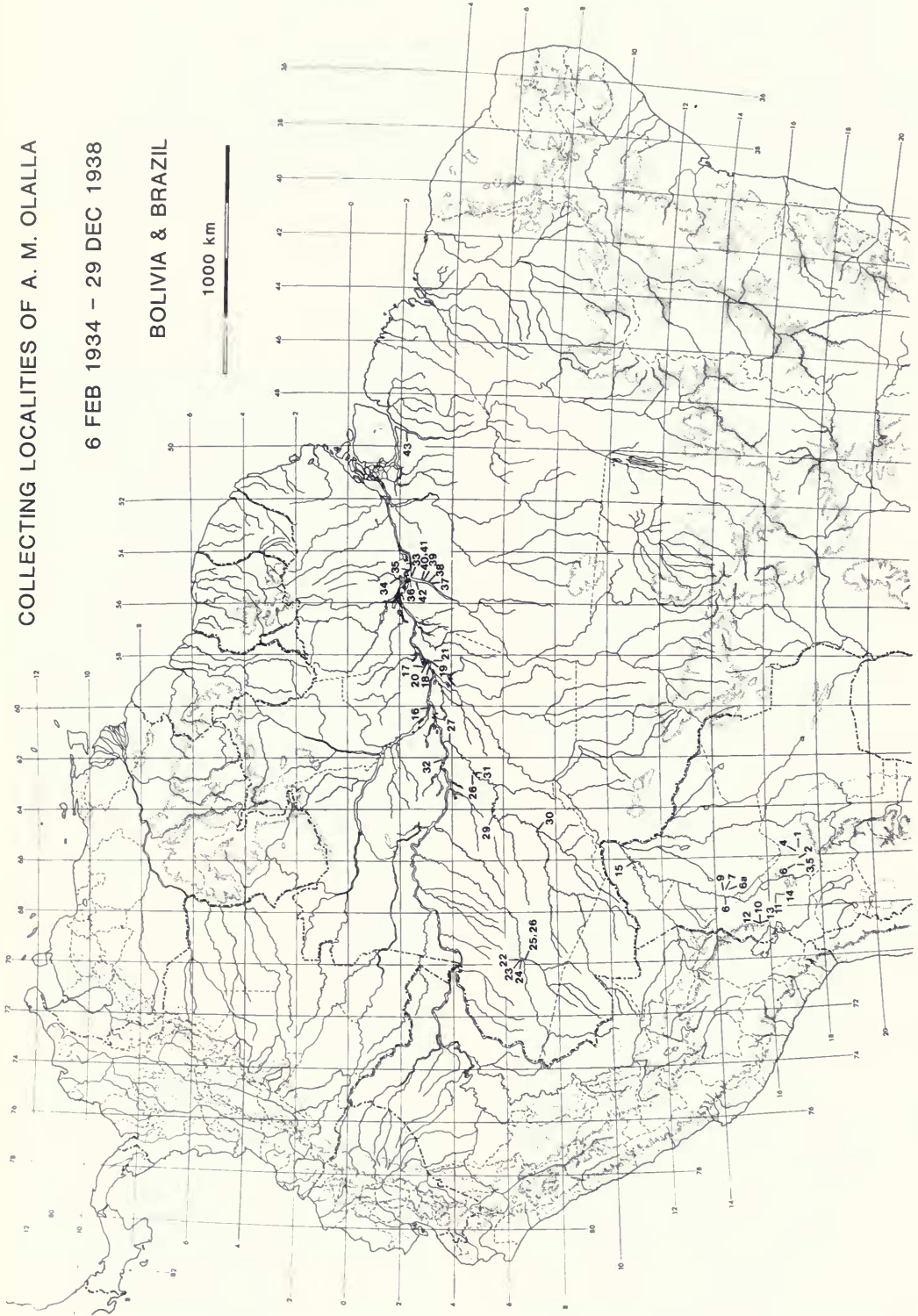


Fig. 1. Map of northern South America, showing collecting localities. Numbers correspond to those in the gazetteer.

## El Beni

- 6a) Mojós, Orión, 196 m [ca. 14°30'S, 67°20'W; about 35 km S of Reyes on road to San Borja; swamps alternating with patches of tropical forest], 30 May 1938.
- 7) Río Beni, El Consuelo, 196 m [ca. 14°20'S, 67°15'W; about 12 km E of Reyes: a small estancia on pampas, with dense thickets and boggy pools], 7–11 Jan 1938.
- 8) Río Beni, Puerto Salinas, 226 m [14°20'S, 67°33'W; camp a few kilometers E of settlement, in an area overgrown with tropical forest except for a few cultivated fields; sampled at the beginning of the rainy season], 27 Nov–4 Dec 1937.
- 9) Río Beni, Reyes, 196 m [14°19'S, 67°23'W; ca. 19 km E of Río Beni: open pampas, surrounded by marshes], 25 Dec 1937.

## La Paz

- 10) Chilcani, Mte. Illampu [3700 m; ca. 15°44'S, 68°44'W], 25 Jul–4 Aug 1938.
- 11) Chulumani, 1740 m [16°24'S, 67°31'W], 23–30 Sep 1938.
- 12) Huancuni [3050 m; 15°44'S, 68°35'W], 15–18 Jul 1938.
- 13) Sorata, Mte. Illampu, 2647 m [15°47'S, 68°40'W; NW side of mountain], 21 Jul–5 Aug 1938.
- 14) Sud Yungas, Laza [2100 m; 16°25'S, 67°26'W], 4 Oct 1938.

## Pando

- 15) Victoria, confluencia de los Ríos Madre de Dios-Beni, 175 m [10°59'S, 66°10'W; 3 km from left bank of Río Beni and about 9 km from confluence: camp in virgin forest, with high grass and thick brush along riverbanks and dense forest with little undergrowth in the interior], 9–27 Oct 1937.

## Brazil

### Amazonas

- 16) Manaus [21 m; 3°08'S, 60°01'W; left bank of Rio Amazonas at mouth of Rio Negro: forest], various dates between Jun and Oct 1935.

- 17) Rio Amazonas, Igarapé Anibá [= Anebá; 2°55'S, 58°33'W, N bank tributary of Rio Amazonas, directly N of Itacoatiara], 19 Mar–28 Apr 1936.
- 18) Rio Amazonas, Itacoatiara [28 m; 3°08'S, 58°25'W; N bank below confluence with Rio Madeira; Olalla's home during the expeditions], 11–12 Jan 1935, 10 Nov 1935–4 Jan 1936.
- 19) Rio Amazonas, Lago do Baptista [25 m; 3°18'S, 58°15'W; small lake on the Ilha Tupinambarama, about 25 km SE of Itacoatiara], 14 Aug 1934 and various dates during 1936.
- 20) Rio Amazonas, Lago do Canaçary [= Lago Canaçari; 2°57'S, 58°15'W; large lake on N bank just below Itacoatiara], various dates between 2 Jan and 10 Mar 1936.
- 21) Rio Amazonas, Lago Tapayuna [= Tapaiúna; 25 m; 3°23'S, 58°16'W; S bank opposite Itacoatiara on Ilha Tupinambarama], 29 Apr–17 May 1936.
- 22) Rio Juruá, Igarapé do Gordão [ca. 6°30'S, 69°50'W; left bank tributary, 12 mi N of Eirunepé, the camp situated at its mouth: dense virgin forest in a hilly terrain, with palm stands along the igarapé], 9–18 Aug 1936.
- 23) Rio Juruá, Igarapé Grande [ca. 6°35'S, 69°50'W; right bank tributary, halfway between Igarapé do Gordão and Eirunepé: virgin forest on flat terrain], 25 Aug–5 Sep 1936.
- 24) Rio Juruá, João Pessoa [= Eirunepé; 130 m; 6°40'S, 69°52'W; settlement of 400 people on left bank of upper river just above confluence with Rio Eirú and Rio Tarauacá; dense forest of tall, lanky aspect surrounded by igapó], various dates between 18 Apr and 9 Sep 1936.
- 25) Rio Juruá, Lago Grande [130 m; ca. 6°40'S, 69°52'W; lake on right bank almost opposite Eirunepé, but according to Gyldenstolpe (1945a) including specimens collected in the triangle between the Juruá and the Rio Eirú: forest with great number of gigantic trees on flat and seasonally flooded terrain], 5–16 Sep 1936.
- 26) Rio Juruá, Rio Eirú, Santo Antônio [6°41'S, 69°53'W; camp on right bank of Rio Eirú—a right bank tributary of the Rio Juruá—close to mouth: in *Mauritia* palm stands and “terra-firme and igapó forests”], 19 Sep–3 Oct 1936.
- 27) Rio Purus, Igarapé do Castanha [3°52'S, 61°23'W; right bank of lower river about 6 km above Beruri, uninhabited by humans: hilly grounds with low ridges, tall luxuriant forest dominated by chestnut-trees (*Berthol-*

- letia excelsa*), with tangled understory], 29 Sep–11 Oct 1935.
- 28) Rio Purus, Itaboca [4°53'S, 62°41'W; left bank of lower river opposite Redempção, inhabited by a single native family, with topography and vegetation similar to those of Redempção], 19–27 Nov 1935.
  - 29) Rio Purus, Jaburú [= Jaburu; 5°36'S, 64°03'W; left bank of lower river below its confluence with Rio Tapauá, about 190 km upstream from Itaboca, inhabited by two native families; tall forest on hilly ground], 11 Dec 1935.
  - 30) Rio Purus, Labrea [= Lábrea; 60 m; 7°16'S, 64°47'W; right bank of upper river just below confluence with Rio Ituxi, a large settlement about 200 km upstream from Jaburú, surrounded by cultivated fields: on hilly ground marked by a few deep gullies and extensive savanna to the south], 9 Jan 1936.
  - 31) Rio Purus, Redempção [= Redenção; 4°58'S, 62°35'W; right bank at mouth of Paraná Tata-putauá, opposite Itaboca and largely uninhabited: forest mainly primary], 11–14 Nov 1935.
  - 32) Rio Solimões, Codajáz [= Codajás; 3°50'S, 62°05'W; left bank of lower river at 38 m], various dates between 2 Jun and 18 Dec 1935.
  - 39) Rio Tapajós (Este), Marai [= Igarapé Maroi; 2°51'S, 55°03'W; small right bank tributary, across from Boim], 4–14 Feb 1934.
  - 40) Rio Tapajós (Este), Prainha [ca. 3°00'S, 55°07'W; right bank, about halfway from Santarém to Aveiro], 16–26 Feb 1934.
  - 41) Rio Tapajós (Oeste), Iroçanga [ca. 2°30'S, 55°10'W; opposite Iroçanga, which is on the right (east) bank of lower river just below Boim; Olalla's tags clearly indicate specimens having been collected on the west bank], 5–26 Apr 1934.
  - 42) Rio Tapajós (Oeste), Patinga [ca. 2°28'S, 55°08'W; left bank of lower river between its mouth and Boim], 2–7 May 1934.
  - 43) Rio Tocantins, Cametá [25 m; 2°15'S, 49°30'W; left bank of lower river, just above its mouth], 11 Jul–9 Aug 1934.

## Para

- 33) Rio Tapajós (Boca do, Foz do), Santarém [15 m; 2°26'S, 54°42'W; right bank of Rio Amazonas at confluence with Rio Tapajós: town surrounded by savannas for 2 km, giving way in turn to tall, dense forest], 20–30 Jun, 21–24 Aug 1934.
- 34) Rio Amazonas, Pataua [ca. 1°55'S, 55°00'W; N bank of river opposite and above mouth of Rio Tapajós, just above Lago Cuipeua: virgin forest, terrain varied and dry], 4–7 Jan 1935.
- 35) Rio Amazonas, Ilha da Urucurituba [ca. 2°24'S, 54°41'W; at mouth of Rio Tapajós], 14–17 Aug 1934.
- 36) Rio Arapiuns, Casa Nova [ca. 2°20'S, 55°03'W; at its confluence with Rio Tapajós], 9–15 Jul 1934.
- 37) Rio Tapajós (Este), Aveiros [= Aveiro; 3°15'S, 55°10'W; right bank of lower river opposite Boim], 1–18 Mar, 5–20 Jun 1934.
- 38) Rio Tapajós (Este), Itapoama [ca. 3°15'S, 55°10'W; right bank of lower river just below Aveiro], 21 Mar–4 Apr 1934.

## Species Accounts

### Order DIDELPHIMORPHIA

#### Family DIDELPHIDAE

#### Subfamily DIDELPHINAE

#### *Monodelphis brevicaudata* (Erxleben, 1777)

FIELD NUMBERS—467 ♂, 541 ♂ / 7374 ♀.

DISTRIBUTIONAL RECORDS—Cametá (2), Marai.

MEASUREMENTS—AGE 2 (5–6) 5.50; TOTL 3 (230–260) 240.66; TAIL 3 (80–91) 87; FOOT 3 (21–25) 22.66; GLS 2 (21.93–40.86) 31.39; CIL 2 (19.67–40.22) 29.94; NL 3 (10.58–20) 16.11; ZB 3 (9.38–21.95) 17.53; IOB 3 (5.37–6.37) 5.92; BCW 3 (9.44–16.11) 13.47; CD 3 (7.87–11.93) 10.37; PTL 3 (9.47–21.29) 17.10; MTR 3 (7.95–13.71) 11.73.

AMO 467 was caught in a mousetrap placed near a hole on the forest floor. Additional records of *M. brevicaudata* from Faro and Fordlândia in the state of Pará are documented by specimens in the American Museum collection.

#### *Monodelphis emiliae* (Thomas, 1912)

FIELD NUMBER—1615 ♀.

DISTRIBUTIONAL RECORD—Lago Tapayuna.

MEASUREMENTS—AGE ♂; TOTL 90; TAIL 55; FOOT 20; GLS 31.67; CIL 30.66; NL 14.83; ZB 17.51; IOB 5.94; BCW 12.34; CD ♂; PTL ♂; MTR 10.96.

This specimen from the south bank of the Amazon opposite Manaus is the twelfth known for this species (see Pine and Handley, 1984, for information on previous records). Its occurrence along the Amazon helps to close a huge distributional gap between the west bank of the Rio Tapajós and Loreto, Perú. The skull of this species is depicted in Figure 2.

### *Micoureus cinereus* (Temminck, 1824)

FIELD NUMBERS—469 ♂ / 1038 ♀.

DISTRIBUTIONAL RECORDS—Cametá, Codajáz.

MEASUREMENTS—AGE 2 (5–5.5) 5.25; TOTL 2 (400–490) 445; TAIL 2 (230–300) 265; FOOT 2 (30–30) 30; GLS 2 (42.64–47.25) 44.94; CIL 41.06; NL 2 (18.61–19.38) 18.99; ZB 23.61; IOB 2 (6.76–7.32) 7.04; BCW 2 (15.14–18.87) 17; CD 2 (12.95–16.49) 14.72; PTL 21.24; MTR 2 (14.46–14.9) 14.68.

Although this species is known to be mainly arboreal (Miles et al., 1981), AMO 1038 was caught on the ground. Both specimens were taken in July (dry season), when the species appears to be most active (Fonseca and Kierrulff, 1988).

### *Marmosa murina* (Linnaeus, 1758)

FIELD NUMBERS—620 ♀ / 1051 ♀, 994 ♂ / 2404 ♂ / 258 ♂, 259 ♀ / 1440 ♀ / 27 ♂, 28 ♀ / 2349 ♀, 2351 ♂.

DISTRIBUTIONAL RECORDS—Casa Nova, Codajáz (2), Igarapé Grande, Iroçanga (2), Itacoatiara, Itapoama (2), João Pessoa (2).

MEASUREMENTS—AGE 9 (4–6) 5.44 [12.52]; TOTL 11 (256–345) 295.27 [8.07]; TAIL 11 (159–201) 178.09 [7.83]; FOOT 11 (18–24) 21.45 [8.93]; GLS 8 (32.24–37.63) 34.73 [4.57]; CIL 9 (29.65–36.55) 32.56 [6.18]; NL 9 (13.8–16.25) 15.15 [5.26]; ZB 7 (18.08–20.56) 19.27 [4.52]; IOB 9 (5.2–6.67) 5.67 [7.5]; BCW 10 (12.55–13.91) 13.38 [3.37]; CD 8 (10.86–12.11) 11.34 [3.78]; PTL 7 (15.8–19.47) 17.4 [7.1]; MTR 10 (11–12.15) 11.52 [2.88].

AMO 1051 (from Codajáz) was taken from a high vine tangle, and AMO 620 was also taken above ground level, but nearly half of 71 captures of this species in Venezuela were on the ground (Handley, 1976). The tags for AMO 259 and AMO 1440 indicate that three and seven young, respectively, were captured with their mothers.

Specimens from the Rio Juruá are slightly darker



FIG. 2. Cranium and mandible of *Monodelphis emiliae* (AMO 1615). White bar = 5 mm.

dorsally than those from farther east. However, tail scales of Juruá specimens average substantially darker. The race *madeirensis* apparently extends from Pará in Brazil to Loreto and Huánuco, Perú, although Avila Pires (1958) referred specimens from the vicinity of Belém to the nominate race. Measurements and data for a lone Bolivian representative of this species, probably racially distinct, are given separately below.

FIELD NUMBER—88 ♂.

DISTRIBUTIONAL RECORD—Puerto Salinas.

MEASUREMENTS—AGE 4; TOTL 245; TAIL 130; FOOT 18; GLS  $\phi$ ; CIL  $\phi$ ; NL 12.30; ZB  $\phi$ ; IOB  $\phi$ ; BCW 12.15; CD  $\phi$ ; PTL 14.38; MTR 10.17.

### *Gracilinanus agilis* (Burmeister, 1854)

FIELD NUMBER—133 ♀.

DISTRIBUTIONAL RECORD—Reyes.

MEASUREMENTS—AGE  $\phi$ ; TOTL 180; TAIL 105; FOOT 15; GLS  $\phi$ ; CIL  $\phi$ ; NL  $\phi$ ; ZB  $\phi$ ; IOB  $\phi$ ; BCW  $\phi$ ; CD  $\phi$ ; PTL  $\phi$ ; MTR  $\phi$ .

This specimen from the middle Beni of Bolivia falls within the distribution for *G. agilis* as plotted by Creighton (in press). If subspecific distinction of central Bolivian material were warranted (cf. Tate, 1933), the name *buenavistae* would apply.



FIG. 3. Cranium and mandible of *Gracilinanus emiliae* (AMO 2409). White bar = 5 mm.

Use of the generic name *Gracilinanus* follows Gardner and Creighton (1989).

### *Gracilinanus emiliae* (Thomas, 1909)

FIELD NUMBERS—1058 ♂ / 2409 ♀.

DISTRIBUTIONAL RECORDS—Codajáz, Igarapé Grande.

MEASUREMENTS—AGE 3.5; TOTL 2 (184–190) 187; TAIL 2 (113–120) 116.5; FOOT 2 (14–15) 14.5; GLS 22.67; CIL 2 (20.39–21.37) 20.88; NL 2 (8.84–9.43) 9.13; ZB 2 (12.21–12.36) 12.28; IOB 2 (3.96–4.2) 4.08; BCW 10.33; CD 8.32; PTL 10.69; MTR 2 (6.94–7.06) 7.0.

AMO 1058 was caught in a mousetrap placed in a high vine tangle.

The two imperfectly preserved juveniles clearly represent *Gracilinanus* on the basis of size, tail length and scalation, and skull morphology (fig. 3). The exceptionally long tails and bright rufous coloration of both specimens identify them as *G. emiliae*. Both represent highly valuable distributional records (see Creighton, in press). The specimen from Codajáz represents the second record north of the Rio Amazonas and the first from west of the Rio Negro (see Avila Pires, 1964), and that from Igarapé Grande represents the first record

south of the Rio Amazonas and west of the Rio Tapajós, more than 1,600 km E of the Rio Juruá locality.

### Subfamily CALUROMYINAE

#### *Caluromys philander philander* (Linnaeus, 1758)

FIELD NUMBERS—461 ♂ / 1432 ♂, 1434 ♀.

DISTRIBUTIONAL RECORDS—Cametá, Itacoatiara (2).

MEASUREMENTS—AGE 2 (5–5.5) 5.25; TOTL 3 (480–515) 493.33; TAIL 3 (275–300) 285; FOOT 3 (30–38) 33; GLS 50.98; CIL 2 (42.12–47.75) 44.93; NL 20.34; ZB 30.91; IOB 2 (6.82–8.73) 7.77; BCW 2 (17.72–20.03) 18.87; CD 2 (15.91–18.64) 17.27; PTL 2 (21.82–23.86) 22.84; MTR 2 (14.26–14.77) 14.51.

AMO 1434 contained six “embriones” (attached young?) on 28 December 1935, consistent with Davis’s (1947) statement that the breeding season lasts from August to February. In southeastern Brazil, the species occurs in introduced eucalyptus, as well as primary forest (Stallings, 1988); Davis (1947) recorded it only from second growth.

Streilein (1982) showed the range of this species in Brazil as disjunct, with populations in southeastern Brazil well separated from others near the mouth of the Amazon. Specimens in the American Museum of Natural History document the western extent of southern populations to at least the Rio Madeira.

### Order CHIROPTERA

#### Family EMBALLONURIDAE

#### Subfamily EMBALLONURINAE

#### *Rhynchonycteris naso* (Wied-Neuwied, 1820)

FIELD NUMBERS—415 ♀, 7474 ♂, 7475 ♀ / 599 ♂, 600 ♂ / 31 ♂, 32 ♂, 33 ♀, 34 ♀ / 1177 ♀.

DISTRIBUTIONAL RECORDS—Aveiros (3), Ilha da Urucurituba (2), Itapoama (4), Redempção.

MEASUREMENTS—AGE 9 (6–6) 6; TOTL 9 (50–60) 54.44 [7.18]; TAIL 9 (9–17) 11.72 [2.28]; FOOT 9 (5–7) 6.61 [10.55]; FA 10 (30–40) 36.65 [7.77]; GLS 7 (11.47–12.28) 11.83 [2.24]; CIL 4 (10.13–10.48) 10.33; ZB ♂; IOB 7 (2.38–2.5) 2.43 [1.76]; BCW 8 (5.8–6.32) 6.12 [2.77]; CD 5 (6.03–6.41)



6.25; MAST 7 (6.16–6.4) 6.31 [1.36]; PAL 2 (4.45–4.59) 4.52; GMB 3 (4.11–4.37) 4.28; UTR 4 (4.38–4.51) 4.42; MNTR 8 (4.66–5.05) 4.88 [2.55].

Most of these specimens were taken from dead tree trunks over water, a characteristic roosting site (Bradbury and Emmons, 1974; Emmons, 1990). AMO 1177 was taken from an old trunk. AMO 32–34 (1 ♂, 2 ♀, both pregnant) were taken on 4 April 1934. AMO 599 and 600 (both ♂♂) were collected on 17 August 1934. Ecological and behavioral characteristics of this species were noted by Carvalho (1960). Goodwin and Greenhall (1961) noted the preference of this species for well-lighted roosts and the resemblance of its pelage to tree bark.

In the central Amazon Basin, this species appears to inhabit secondary growth (Reis and Peracchi, 1987), whereas in the lower basin along the Rio Tapajós, *R. naso* occupies primary forest sites (Reis and Schubart, 1979). Although most known capture records are from low elevations near water, A. L. Gardner (in litt.) collected *R. naso* in Venezuela from the walls of abandoned buildings.

### **Saccopteryx bilineata** (Temminck, 1838)

FIELD NUMBERS—1080 ♂ / 2414 ♀, 2441 ♀ / 1140 ♂, 1141 ♀, 1142 ♀, 1143 ♀ / 1079 ♀ / 277 ♂, 278 ♂, 279 ♀, 280 ♀, 281 ♀, 282 ♀, 294 ♂, 295 ♂, 296 ♀, 595 ♀, 82 ♀, 83 ♀ / 1425 ♂, 1426 ♀, 1427 ♂ / 2226 ♂, 2463 ♂, 2464 ♀ / 2466 ♀ / 1474 ♀, 1486 ♂, 1487 ♀, 1488 ♀ / 14 ♀, 15 ♀, 16 ♂, 17 ♀.

DISTRIBUTIONAL RECORDS—Codajáz, Igarapé Grande (2), Igarapé do Castanha (4), Ilha da Urucurituba, Iroçanga (12), Itacoatiara (3), João Pessoa (3), Lago Grande, Lago do Baptista (4), Victoria (4).

MEASUREMENTS—AGE 24 (6–6) 6; TOTL 32 (60–82) 72.69 [6.27]; TAIL 32 (10–25) 15.75 [20.27]; FOOT 32 (9–15) 11.66 [12.06]; FA 35 (36–51) 46.54 [6.33]; GLS 23 (16.76–17.87) 17.39 [1.72]; CIL 10 (14.64–15.75) 15.3 [1.99]; ZB 18 (10.34–11.55) 10.95 [2.96]; IOB 26 (2.58–3.28) 2.78 [6.32]; BCW 23 (7.85–8.43) 8.13 [1.98]; CD 22 (8.22–8.82) 8.52 [2.06]; MAST 24 (8.36–9.11) 8.8 [2.47]; PAL 13 (6.28–7.19) 6.79 [3.97]; GMB 25 (7–7.82) 7.42 [3.0]; UTR 14 (7.22–7.68) 7.38 [1.91]; MNTR 27 (7.38–8.36) 7.87 [2.91].

Specimens were taken from a live tree in terra firma (Igarapé do Castanha), a live tree in virgin forest (Iroçanga, Codajáz), a dead tree on the ground (João Pessoa), a hole in a log in igapó forest (Ilha da Urucurituba), and a hole in a castanheira

(Brazil nut tree) (Itacoatiara), and were shot while flying (Lago do Baptista). Specimens taken the same day in the same locality, and thus possibly members of a group, included numbers 1140–1143 (1 ♂, 3 ♀), 1486 and 1487 (1 ♂, 1 ♀), 82 and 83 (2 ♀), 277–282 (2 ♂♂, 4 ♀), 294–296 and 595 (2 ♂♂, 2 ♀), 1425–1427 (2 ♂♂, 1 ♀), 2463 and 2464 (1 ♂, 1 ♀), 14 and 15 (2 ♀), and 16 and 17 (1 ♂, 1 ♀). On Trinidad, Bradbury and Emmons (1974) found most *S. bilineata* roosts in the buttress cavities of certain species of trees, with lower and better-lit cavities of hollow trees also being utilized. They also noted that bats roosting alone were invariably males; here, a lone female was collected from Ilha da Urucurituba (AMO 1079), but whether it was roosting alone cannot be determined from the data at hand.

Near Manaus, *S. bilineata* inhabits both primary- and secondary-growth habitats (Reis and Peracchi, 1987).

### **Saccopteryx leptura** (Schreber, 1778)

FIELD NUMBERS—7490 ♂ / 145 ♀, 293 ♂ / 2345 ♂, 2346 ♀ / 1486 ♂.

DISTRIBUTIONAL RECORDS—Aveiros, Iroçanga (2), João Pessoa (2), Lago do Baptista.

MEASUREMENTS—AGE 4 (6–6) 6; TOTL 5 (53–65) 60.60; TAIL 5 (9–17) 13.60; FOOT 5 (7–9) 8.2; FA 4 (38–41.5) 40.37; GLS 4 (14.11–14.58) 14.33; CIL 2 (12.44–12.64) 12.54; ZB 3 (8.95–9.06) 9.01; IOB 4 (2.26–2.47) 2.38; BCW 3 (6.99–7.19) 7.11; CD 3 (6.81–7.26) 7.07; MAST 4 (7.34–7.53) 7.44; PAL 2 (5.34–5.44) 5.39; GMB 4 (5.98–6.26) 6.08; UTR 2 (5.69–5.78) 5.74; MNTR 4 (5.89–6.2) 6.08.

Notes on specimen tags indicate that most *S. leptura* were collected from the trunks of live and dead trees either on the beach, in primary-growth forest, or in secondary growth. Carriker (in Allen, 1911) noted the preference of this species for well-lighted roosts (see also Emmons, 1990). In Trinidad, Bradbury and Emmons (1974) found that these bats preferred more exposed locations than *S. bilineata*, typically roosting 3–10 m high on the boles of trees. AMO 2345 and 2346 were taken on 18 April 1936. Reis and Peracchi (1987) recorded *S. leptura* only from secondary growth around Manaus.

The single specimen from Aveiros differs from others in its smaller size. Measurements for this specimen are presented separately here: AGE 5; TOTL 60; TAIL 12; FOOT 10; FA 35; GLS 13.37;

CIL 11.83; ZB 8.41; IOB 2.39; BCW  $\phi$ ; CD  $\phi$ ; MAST 7.07; PAL 5.04; GMB  $\phi$ ; UTR 5.24; MNTR 5.79.

### *Cormura brevirostris* (Wagner, 1843)

FIELD NUMBER—2413 ♀.

DISTRIBUTIONAL RECORD—Igarapé Grande.

MEASUREMENTS—AGE 6; TOTL 60; TAIL 10; FOOT 8; FA 47; GLS 15.78; CIL  $\phi$ ; ZB  $\phi$ ; IOB 2.86; BCW 7.70; CD  $\phi$ ; MAST 8.54; PAL  $\phi$ ; GMB 7.20; UTR  $\phi$ ; MNTR  $\phi$ .

This record augments a widespread but spotty distribution within the Amazon Basin, ranging at least from Loreto, Perú, through the Madeira, Negro, Uaupés, and Tapajós tributaries of the lower Amazon (AMNH specimens). Garbe also collected this species along the Rio Juruá (Ihering, 1904). Nowhere encountered frequently, *Cormura* has been recorded in secondary growth near Manaus (Reis and Peracchi, 1987).

### *Peropteryx macrotis* (Wagner, 1843)

FIELD NUMBERS—2308 ♂, 2309 ♀.

DISTRIBUTIONAL RECORD—Igarapé do Gordão (2).

MEASUREMENTS—AGE  $\phi$ ; TOTL 2 (50–55) 52.50; TAIL 2 (7–13) 10; FOOT 2 (7–7) 7; FA 2 (37–38) 37.5; GLS  $\phi$ ; CIL  $\phi$ ; ZB  $\phi$ ; IOB  $\phi$ ; BCW  $\phi$ ; CD  $\phi$ ; MAST  $\phi$ ; PAL 5.04; GMB 5.33; UTR 2 (5.47–5.52) 5.49; MNTR 2 (5.52–5.62) 5.57.

Both specimens were shot on 10 August 1936, about 5 m above ground on a tree trunk in the forest. They appear to represent the nominate race. On Trinidad, *P. macrotis* was found roosting in sea-caves (Goodwin and Greenhall, 1961), and elsewhere it roosts preferentially near or on the ground (i.e., “rock piles, rock crevices, caves, hollow logs, houses, or tunnels”; Emmons, 1990). The single record of this species from near Manaus (Reis and Peracchi, 1987) was taken in primary forest, but Handley (1976) recorded *P. macrotis* in a variety of man-made habitats.

### *Peropteryx leucoptera cyclops* (Thomas, 1924)

FIELD NUMBERS—2518 ♀, 2519 ♀.

DISTRIBUTIONAL RECORDS—Santo Antônio (2).

MEASUREMENTS—AGE 2 (6–6) 6; TOTL 2 (66–

70) 68; TAIL 2 (10–10) 10; FOOT 2 (10–11) 10.5; FA 2 (44–47) 45.5; GLS  $\phi$ ; CIL  $\phi$ ; ZB 2 (9.8–10) 9.9; IOB 2 (3.3–3.38) 3.34; BCW 7.62; CD 7.43; MAST 7.95; PAL  $\phi$ ; GMB 7.26; UTR 2 (6.2–6.85) 6.53; MNTR 2 (6.69–7.27) 6.98.

Both specimens were collected on 23 September 1936. Their allocation to the western race is based on a broader, more inflated skull (cf. Thomas, 1924).

### *Peropteryx leucoptera leucoptera* Peters, 1867

FIELD NUMBERS—1438 ♂ / 1501 ♀.

DISTRIBUTIONAL RECORDS—Itacoatiara, Lago do Baptista.

MEASUREMENTS—AGE  $\phi$ ; TOTL 2 (63–65) 64; TAIL 2 (12–15) 13.5; FOOT 2 (7–11) 9; FA 2 (42–42) 42; GLS  $\phi$ ; CIL  $\phi$ ; ZB  $\phi$ ; IOB 3.46; BCW 7.04; CD  $\phi$ ; MAST  $\phi$ ; PAL 6.33; GMB 2 (7.16–7.26) 7.21; UTR 2 (6.05–6.25) 6.15; MNTR 6.87.

Outside Manaus, this species inhabits primary forest (Reis and Peracchi, 1987).

## Family NOCTILIONIDAE

### *Noctilio albiventris affinis* d'Orbigny, 1835

FIELD NUMBERS—2370 ♂, 2371 ♀ / 1643 ♂, 1644 ♂, 1645 ♂, 1646 ♀, 1647 ♀, 1648 ♀ / 1475 ♂, 1476 ♂, 1477 ♂, 1478 ♂, 1500 ♂ / 2532 ♂, 2533 ♂, 2534 ♂, 2539 ♀, 2540 ♀, 2541 ♀, 2544 ♀, 2545 ♀.

DISTRIBUTIONAL RECORDS—João Pessoa (2), Lago Tapayuna (6), Lago do Baptista (5), Santo Antônio (8).

MEASUREMENTS—AGE 17 (6–6) 6; TOTL 19 (85–99) 89.42 [3.87]; TAIL 19 (15–20) 19.47 [6.25]; FOOT 19 (15–21) 16.94 [12.04]; FA 21 (58–69) 61.86 [4.32]; GLS 11 (20.88–23.7) 21.99 [4.17]; CIL 17 (18.4–20.6) 19.31 [2.86]; ZB 14 (13.52–16.64) 15.44 [5.02]; IOB 17 (4.48–6.35) 5.95 [6.79]; BCW 15 (10.88–11.85) 11.43 [2.34]; CD 12 (10.93–13.38) 11.85 [7.28]; MAST 12 (12.9–16.23) 14.47 [7.23]; PAL 17 (7.38–10.33) 9.34 [7.05]; GMB 19 (9.42–10.48) 9.81 [2.76]; UTR 21 (7.3–8.05) 7.65 [2.75]; MNTR 19 (8.17–9.02) 8.54 [2.99].

Most specimens were collected from holes in live trees and dead palms or while flying. Reis and Peracchi (1987) noted similar roosting sites for lesser noctilios near Manaus, where these bats are most frequent in várzea forests. Series collected

on the same day included 1475–1477 (3 ♂♂), 2370 and 2371 (1 ♂, 1 ♀), 2532–2534 (3 ♂♂), 2539–2541 (3 ♀♀), 2544 and 2545 (2 ♀♀), and 1643–1648 (3 ♂♂, 3 ♀♀).

The distribution and taxonomy of lesser noctilios was reviewed by Davis (1976) and various features of their biology by Hood and Pitocchelli (1983). Davis allocated lesser noctilios from the western Amazon Basin as far east as the Rio Madeira to *affinis*, the largest and darkest of the four races he recognized. In the material at hand, the ranges of larger, darker noctilios and smaller, paler noctilios apparently overlap near the confluence of the Amazon and Madeira rivers. Specimens from Lago Tapayuna and Lago do Baptista more closely resemble *affinis*, whereas those from Itacoatiara are referable to the nominate subspecies (Davis, 1976). The significance of such a distribution pattern is unknown, but the pattern presumably represents either a polymorphism or else microparapatry or sympatry. Taddei et al. (1986) described patterns of variation among lesser noctilios in more southern portions of their range (see also Myers and Wetzel, 1983).

### **Noctilio albiventris albiventris**

Desmarest, 1818

FIELD NUMBERS—414 ♀ / 596 ♂ / 1411 ♂, 1412 ♂, 1413 ♂, 1414 ♂, 1415 ♂, 1416 ♀, 1417 ♀, 1418 ♀, 1419 ♀, 1420 ♀, 1421 ♀, 1422 ♀, 1423 ♀ / 20 ♀ / 657 ♂, 658 ♂, 659 ♂ / 7413 ♂, 7417 ♂, 7418 ♂, 7419 ♂, 7420 ♂, 7421 ♂, 7422 ♂, 7423 ♂, 7424 ♂, 7425 ♂, 7426 ♂ / 428 ♂, 429 ♀.

DISTRIBUTIONAL RECORDS—Aveiros, Ilha da Urucurituba, Itacoatiara (13), Itapoama, Pataúá (3), Prainha (11), Santarém (2).

MEASUREMENTS—AGE 29 (6–6) 6; TOTL 32 (70–95) 84.5 [6.75]; TAIL 32 (10–20) 15.85 [18.11]; FOOT 32 (14–19) 16.52 [8.84]; FA 32 (57–62) 60.47 [2.56]; GLS 24 (19.27–22.67) 21.12 [4.29]; CIL 28 (17.32–19.68) 18.61 [2.85]; ZB 22 (14.05–15.89) 14.97 [3.81]; IOB 32 (5.54–6.28) 5.91 [3.05]; BCW 28 (10.87–11.66) 11.2 [1.91]; CD 27 (10.4–13.6) 11.57 [8.22]; MAST 10 (13.35–15.4) 14.44 [4.25]; PAL 30 (8.17–10.16) 8.94 [4.45]; GMB 32 (8.76–9.84) 9.39 [3.12]; UTR 30 (6.75–7.8) 7.25 [4.55]; MNTR 32 (7.63–8.77) 8.16 [3.06].

Specimens of this taxon were taken while flying or were collected from a hole in a live tree near water (most Prainha specimens), a hole in a dead trunk (Itacoatiara), a hole in a dead palm (Aveiros), or a hole in a live tree in igapó forest (Ilha

da Urucurituba, Pataúá, and Santarém). Those from the last locality were roosting with three *Myotis simus* at the time of collection. Series from Itacoatiara (AMO 1411–1420, 5 ♂♂, 5 ♀♀; AMO 1421–1423, 3 ♀♀), Pataúá (3 ♂♂), and Prainha (AMO 7418–7426, 9 ♂♂), and Santarém (AMO 428 and 429, 1 ♂, 1 ♀) were collected on the same day.

Measurements of an unusually large *Noctilio albiventris* (AMO 2398 ♂) taken at Igarapé Grande are: AGE 6; TOTL 102; TAIL 17; FOOT 20; FA 66; GLS 24.61; CIL 21.01; ZB 16.91; IOB 6.27; BCW 12.14; CD 13.98; MAST 16.80; PAL 10.89; GMB 10.46; UTR 10.37; MNTR 9.16. This locality lies on the right bank of the Rio Juruá. Additional specimens from this drainage are in the Museu de Zoologia, Universidade de São Paulo, and are reported to have even larger forearms, although shorter skulls (Cunha Vieira, 1942).

### **Noctilio leporinus leporinus**

(Linnaeus, 1758)

FIELD NUMBERS—1548 ♂, 1549 ♂, 1550 ♂, 1551 ♂, 1552 ♂, 1553 ♂, 1554 ♀ / 172 ♂, 173 ♂, 174 ♂, 175 ♀, 176 ♀, 177 ♀, 178 ♀, 179 ♀, 180 ♀, 249 ♂ / 1583 ♂, 1584 ♂, 1585 ♂, 1586 ♂, 1587 ♂, 1588 ♂, 1589 ♀ / 1452 ♀.

DISTRIBUTIONAL RECORDS—Igarapé Anibá (7), Iroçanga (10), Lago do Baptista (7), Lago do Canaçary.

MEASUREMENTS—AGE 23 (6–6) 6; TOTL 25 (110–120) 114.4 [2.64]; TAIL 25 (13–30) 22.08 [22.41]; FOOT 25 (22–32) 26.92 [10.39]; FA 25 (68–85) 77.52 [6.04]; GLS 21 (24.33–27.22) 25.98 [3]; CIL 23 (21.97–24.56) 23.32 [2.57]; ZB 21 (17.26–19.4) 18.43 [2.86]; IOB 24 (6.34–7.12) 6.74 [3.03]; BCW 21 (12.85–13.88) 13.32 [2.06]; CD 23 (12.72–15.49) 13.85 [5.84]; MAST 13 (15.68–18.66) 17.25 [5.78]; PAL 25 (11.09–13.17) 12.19 [4.55]; GMB 25 (11.1–12.47) 11.91 [3.05]; UTR 23 (11.19–12.69) 11.88 [3.20]; MNTR 26 (8.38–11.44) 10.59 [5.64].

Greater noctilios were collected in dead and live trees on the beach of the river (Iroçanga), shot at 6 p.m. while flying at the surface of the water (Igarapé Anibá), or collected from a hole in a live tree in second growth (Lago do Baptista). In Trinidad, Goodwin and Greenhall (1961) found only females in roosts that contained gravid bats, whereas the sexes appear to roost together during the remainder of the year. Series collected on the same day included 1548–1550 (3 ♂♂ taken on 24 March 1936), 1551 and 1552 (2 ♂♂ taken on 27

March 1936), 1583–1589 (6 ♂♂, 1 ♀ on 9 April 1936), and 172–180 (3 ♂♂, 6 ♀♀ on 16 April 1934). This species inhabits várzea forest near Manaus (Reis and Peracchi, 1987). Additional Amazonian records of this species are summarized by Davis (1973), and details of its biology by Hood and Jones (1984).

Family **PHYLLOSTOMIDAE**  
Subfamily **PHYLLOSTOMINAE**

***Micronycteris megalotis* (Gray, 1842)**

FIELD NUMBER—7485 ♀.

DISTRIBUTIONAL RECORD—Aveiros.

MEASUREMENTS—AGE 6; TOTL 55; TAIL 13; FOOT 10; FA 37; GLS 18.53; CIL 16.38; ZB 9.01; IOB 4.03; BCW  $\phi$ ; CD 8.57; MAST 7.80; PAL 8.33; GMB 5.84; UTR 7.2; MNTR 7.44.

The specimen was taken from a termite nest in virgin forest. Carriker (in Allen, 1911) and Emmons (1990) noted its preference for well-lighted roosts. Existing records seem to indicate that *M. megalotis* is strongly associated with primary forests and therefore may be a good indicator species for forest quality (cf. Reis and Peracchi, 1987; Anderson et al., 1982). However, R. H. Pine (in litt.) has collected this species from culverts in agricultural grazing areas in Chiapas, México, and 25% of 101 captures of this species in Venezuela were made in yards, pastures, and orchards (Handley, 1976).

***Lonchorhina aurita aurita***  
Tomes, 1863

FIELD NUMBER—597 ♂.

DISTRIBUTIONAL RECORD—Ilha da Urucurituba.

MEASUREMENTS—AGE 6; TOTL 115; TAIL 49; FOOT 10; FA 52; GLS 21.32; CIL 19.61; ZB  $\phi$ ; IOB 5.20; BCW 9.13; CD 8.91; MAST  $\phi$ ; PAL  $\phi$ ; GMB 8.11; UTR 8.36; MNTR 8.42.

This specimen was taken from a hole in a dead tree in igapó forest. Handley (1976) reported that 98% of 131 *L. aurita* were taken near streams and in other moist areas. AMO 597 is similar in external and slightly larger in cranial measurements than a sample of 26 *Lonchorhina a. aurita* from Venezuela and Trinidad analyzed by Linares and Ojasti (1971). Previously, the species has been encountered roosting in caves (Goodwin and

Greenhall, 1961) and mine shafts (Emmons, 1990; see also Linares, 1986).

***Macrophyllum macrophyllum***  
(Schinz, 1821)

FIELD NUMBER—2225 ♂.

DISTRIBUTIONAL RECORD—João Pessoa.

MEASUREMENTS—AGE 6; TOTL 86; TAIL 40; FOOT 15; FA 35; GLS 17.07; CIL 14.90; ZB 9.45; IOB 3.16; BCW 7.85; CD 8.04; MAST 8.73; PAL 6.24; GMB 6.36; UTR 6.23; MNTR 6.47.

This specimen from the Rio Juruá was taken from a hole in a dead tree on the ground. Harrison (1975) summarized known roosting sites for this species. *Macrophyllum* has been recorded from secondary-growth habitats and roosting in association with *Carollia perspicillata* and *Glossophaga soricina* (Reis and Peracchi, 1987). In Bolivia and Perú, *Macrophyllum* is known mainly from the fringes of the Amazon Basin (Harrison, 1975), but it was recently recorded along the Rio Amazonas near Manaus (Reis and Peracchi, 1987). It had not previously been recorded from the Juruá drainage.

***Tonatia sylvicola* (d'Orbigny, 1835)**

FIELD NUMBERS—1607 ♂, 1608 ♂.

DISTRIBUTIONAL RECORD—Igarapé Anibá (2).

MEASUREMENTS—AGE 2 (6–6) 6; TOTL 2 (105–115) 110; TAIL 2 (15–15) 15; FOOT 2 (20–20) 20; FA 2 (55–59) 57; GLS 2 (30.95–31.63) 31.29; CIL 2 (26.06–27.03) 26.54; ZB 2 (14.51–14.63) 14.57; IOB 2 (4.23–4.48) 4.35; BCW 2 (11.23–11.28) 11.25; CD 13.53; MAST 2 (14.54–15.06) 14.80; PAL 2 (13.93–14.47) 14.20; GMB 2 (9.67–9.68) 9.67; UTR 2 (11.33–11.5) 11.41; MNTR 2 (12.08–12.34) 12.21.

Both specimens were collected on 28 April 1936 and appear to represent the nominate race (see Davis and Carter, 1978). They resemble in all respects Cunha Vieira's (1942) description of a specimen from Pará under the name *Tonatia amblyotis*.

Davis and Carter (1978) stated that the correct spelling of the trivial name for this species was "*sylvicola*" rather than "*syvicola*," because the former spelling of the Latin root *silva* accompanied the original description of the species as "*Lophostoma silvicola*" (d'Orbigny, 1835, plate 6). The text description was not published until 1847, when

d'Orbigny used "*Lophostoma sylvicolum*" (p. 11). Inspection of other accounts in the 1847 work beside their corresponding plates makes it clear that the original 1835 spelling was an unedited printer's error and that *Tonatia sylvicola* is the proper name for this round-eared bat. Plate 4 of *Saimiri boliviensis* is given over the legend "*Calitrix entomophagus*" and plate 20 of *Hippocamelus antisensis* appears over the name "*Cerous antisensis*." These misspellings of then-current generic names provide compelling evidence of printer's errors in the publication of the plates (see Article 32(c)(ii) of the ICZN, 1985). d'Orbigny himself used conventional spellings of the generic names in the subsequently published text: "*Callithrix entomophagus* (p. 10)" and "*Cervus antisensis*" (p. 28). Moreover, in his 1847 account, d'Orbigny used "*Lophostoma sylvicolum*" both for the current text as well as in referring to the earlier-published plate. Therefore, these plate names should be considered demonstrably incorrect original spellings that were corrected by d'Orbigny himself. Under Article 32(d) of the Code, incorrect original spellings are to be corrected but have no separate availability, dating from the original, misspelled description (ICZN, 1985).

### **Tonatia sp. nov.**

FIELD NUMBER—263 ♀.

DISTRIBUTIONAL RECORD—Iroçanga.

MEASUREMENTS—AGE 5; TOTL 77; TAIL 7; FOOT 17; FA 50; GLS  $\phi$ ; CIL  $\phi$ ; ZB  $\phi$ ; IOB 4.27; BCW  $\phi$ ; CD  $\phi$ ; MAST  $\phi$ ; PAL 11.95; GMB 8.66; UTR 9.82; MNTR 10.89.

AMO 263 was collected from a hole in a termite mound. Several species of *Tonatia* (including *T. bidens*, *T. sylvicola*, and *T. brasiliensis*) share this preference for roosting in termite colonies (Handley, 1976; Emmons, 1990; pers. obs.).

This subadult animal exhibits a constricted postorbital region, like that of *Tonatia sylvicola*, but has no fold between the ears, like *T. bidens*, the only other large *Tonatia* recorded from the region. The specimen is larger than any bat identified as *T. brasiliensis* in the Field Museum collections. Similar-aged *T. sylvicola* (FMNH 92058, 92059) from Fordlândia, also on the Rio Tapajóz, have similar postorbital constrictions but substantially broader palates ( $C^1$ - $C^1$  widths) and longer mandibles, refuting the notion that AMO 263 is a composite specimen. Moreover, Myers et al. (1983) reported *T. bidens* from Mato Grosso, Bra-

zil, and Paraguay as having much broader postorbital constrictions (5.8 versus 4.3 mm) and broader palates (6.0 versus 5.2 mm).

### **Phyllostomus elongatus** (É. Geoffroy, 1810)

FIELD NUMBERS—594 ♂ / 7443 ♂ / 2521 ♂, 2522 ♀.

DISTRIBUTIONAL RECORDS—Ilha da Urucurituba, Prainha, Santo Antônio (2).

MEASUREMENTS—AGE 4 (6-6) 6; TOTL 4 (95-100) 98.75; TAIL 4 (15-20) 18; FOOT 4 (14-20) 17; FA 4 (61-66) 64; GLS 4 (28.77-31.25) 30.12; CIL 4 (25.14-26.98) 26.07; ZB 4 (15.97-16.83) 16.44; IOB 4 (5.36-5.68) 5.51; BCW 4 (11.08-11.58) 11.30; CD 3 (12.46-13.33) 12.90; MAST 3 (13.74-14.68) 14.19; PAL 4 (12.23-13.61) 13.03; GMB 4 (10.9-11.87) 11.33; UTR 4 (11.52-12.37) 11.90; MNTR 4 (12.09-13.03) 12.58.

Pelage color polymorphism and possible correlation with cranial and dental variation among Brazilian populations of this species deserve careful study and documentation.

### **Phyllostomus hastatus** (Pallas, 1767)

FIELD NUMBERS—155 ♀, 156 ♀, 157 ♀, 158 ♀, 159 ♀, 160 ♀, 161 ♀, 63 ♂, 64 ♀, 65 ♀, 66 ♀, 67 ♀, 68 ♀, 69 ♀, 70 ♀, 71 ♀, 72 ♀ / 1391 ♂, 1392 ♀ / 7499 ♂, 7500 ♂ / 2384 ♂.

DISTRIBUTIONAL RECORDS—Iroçanga (17), Ita-coatiara (2), Itapoama (2), João Pessoa.

MEASUREMENTS—AGE 16 (6-6) 6; TOTL 22 (112-130) 120.22 [4.37]; TAIL 22 (9-23) 13.86 [26.36]; FOOT 22 (17-23) 20.77 [8.65]; FA 22 (78-85) 82.64 [2.19]; GLS 17 (34.74-38.4) 36.81 [2.84]; CIL 18 (31.27-33.49) 32.34 [2.3]; ZB 17 (19.13-21.25) 19.87 [2.93]; IOB 21 (6.43-7.36) 6.9 [3.62]; BCW 17 (13-14.42) 13.86 [2.69]; CD 15 (14.37-16.25) 15.3 [3.82]; MAST 13 (17.58-19.75) 18.57 [3.1]; PAL 21 (14.9-17.06) 16.05 [3.39]; GMB 20 (12.77-14.48) 13.37 [3.09]; UTR 22 (13.66-15.06) 14.45 [2.74]; MNTR 21 (14.51-16.25) 15.22 [2.74].

The specimens from Iroçanga were taken from holes in live trees in virgin forest on 13 April 1934 (63-72; 1 ♂, 9 ♀♀) and 15 April 1934 (155-161; all ♀♀). Specimens from Itacoatiara were flying at 6 p.m. and had been eating fruit. In Venezuela, Carriker (in Allen, 1911) captured 13 individuals (11 ♂♂, 2 ♀♀) in the loft of a house. Near Manaus, *P. hastatus* inhabits both primary- and secondary-

growth forests (Reis and Peracchi, 1987). Examined specimens all fall within the range of the nominate race.

### ***Trachops cirrhosus* (Spix, 1823)**

FIELD NUMBER—598 ♀.

DISTRIBUTIONAL RECORD—Ilha da Urucurituba.

MEASUREMENTS—AGE 6; TOTL 90; TAIL 12; FOOT 16; FA 62; GLS 29.16; CIL 25.95; ZB 14.4; IOB 5.44; BCW 11.63; CD 13.49; MAST 13.31; PAL 11.9; GMB 9.67; UTR 11.52; MNTR 11.4.

The single specimen was taken in a live tree hole in igapó forest. This species is also known to roost in mines (Allen, 1911) and in abandoned cabins in southern São Paulo (pers. obs.). Near Manaus, Reis and Peracchi (1987) found *T. cirrhosus* only in primary forest.

### Subfamily GLOSSOPHAGINAE

#### ***Glossophaga soricina* (Pallas, 1766)**

FIELD NUMBERS—7472 ♀, 7473 ♀ / 2380 ♂.

DISTRIBUTIONAL RECORDS—Aveiros (2), João Pessoa.

MEASUREMENTS—AGE 2 (6–6) 6; TOTL 3 (60–61) 60.33; TAIL 3 (5–5) 5; FOOT 3 (10–11) 10.33; FA 3 (30.5–38) 34.5; GLS 3 (19.95–20.89) 20.29; CIL 2 (18.97–19.7) 19.34; ZB ♂; IOB 3 (4.43–4.68) 4.56; BCW 3 (8.23–8.62) 8.44; CD 2 (7.91–8.27) 8.09; MAST 2 (8.68–8.97) 8.83; PAL 3 (10.43–11.29) 10.74; GMB 5.35; UTR 3 (7.61–8.14) 7.82; MNTR 3 (7.68–7.9) 7.82.

Olalla captured the two Aveiros specimens (both ♀♀) from a hole in a dead tree in secondary growth. Common use of disturbed habitats was also noted for the species near Manaus by Reis and Peracchi (1987). A majority of the 866 Venezuelan *G. soricina* reported by Handley (1976) were collected in secondary-growth habitats.

#### ***Choeroniscus minor* (Peters, 1868)**

FIELD NUMBER—302 ♂.

DISTRIBUTIONAL RECORD—Iroçanga.

MEASUREMENTS—AGE ♂; TOTL 55; TAIL 5; FOOT 9; FA 35; GLS ♂; CIL 20.02; ZB ♂; IOB 3.68; BCW 8.27; CD 7.44; MAST ♂; PAL 12.49; GMB ♂; UTR 7.75; MNTR 7.18.

This specimen was taken from underneath a decayed trunk. Specimens reported by Reis and Peracchi (1987) from near Manaus were taken in nets placed in secondary growth. This infrequently encountered bat was recorded from the Rio Juruá by Cunha Vieira (1942).

### Subfamily CAROLIINAE

#### ***Carollia brevicauda* (Schinz, 1821)**

FIELD NUMBERS—7462 ♀, 7464 ♀ / 1490 ♂.

DISTRIBUTIONAL RECORDS—Aveiros (2), Lago do Baptista.

MEASUREMENTS—AGE 3 (6–6) 6; TOTL 3 (65–70) 66.67; TAIL 3 (5–8) 6.33; FOOT 3 (14–15) 14.33; FA 3 (40–43) 41.67; GLS 3 (22.27–22.71) 22.43; CIL 3 (19.96–20.55) 20.16; ZB 3 (9.4–9.69) 9.57; IOB 3 (5.68–5.76) 5.71; BCW 3 (9.37–9.72) 9.59; CD 2 (9.59–10.11) 9.85; MAST 3 (10.65–11.1) 10.88; PAL 3 (9.79–9.85) 9.82; GMB 3 (7.49–7.93) 7.68; UTR 3 (8.27–8.48) 8.4; MNTR 3 (8.38–8.57) 8.48.

Specimens here regarded as *C. brevicauda* average somewhat smaller than *perspicillata*, have broader, more procumbent  $i_2$  and generally hairier forearms.

#### ***Carollia castanea* H. Allen, 1890**

FIELD NUMBERS—578 ♀, 581 ♀.

DISTRIBUTIONAL RECORD—Ilha da Urucurituba (2).

MEASUREMENTS—AGE 2 (6–6) 6; TOTL 2 (65–74) 69.50; TAIL 2 (5–10) 7.50; FOOT 2 (12–12) 12; FA 2 (39–40) 39.5; GLS 22.93; CIL 20.28; ZB 2 (9.58–9.65) 9.62; IOB 2 (5.55–5.58) 5.57; BCW 9.71; CD 9.93; MAST 11.35; PAL 10.55; GMB 2 (7.6–8.13) 7.87; UTR 2 (8.56–8.57) 8.57; MNTR 2 (8.58–8.89) 8.74.

Another Amazonian record for this distinctive species is at Tahuapinto (AMNH). Its smaller size and distinctively “notched” upper tooththrow easily identify this species of *Carollia*.

#### ***Carollia perspicillata* (Linnaeus, 1758)**

FIELD NUMBERS—7454 ♀, 7455 ♀, 7456 ♀, 7457 ♀, 7458 ♀, 7459 ♀, 7460 ♀, 7461 ♀, 291 ♀ / 2310 ♀ / 575 ♂, 576 ♂, 577 ♀, 579 ♀, 580 ♀, 582 ♀, 583 ♀, 584 ♀, 585 ♀ / 52 ♀ / 1385 ♂ / 2131 ♂, 2141 ♀, 2148

♂, 2152 ♀, 2180 ♂, 2181 ♂, 2182 ♀, 2203 ♀, 2229 ♂, 2130 ♂ / 1489 ♀, 1484 ♂, 1590 ♀ / 7427 ♂, 7428 ♂, 7429 ♂, 7430 ♂, 7431 ♂, 7432 ♂, 7433 ♂, 7434 ♂, 7435 ♂.

**DISTRIBUTIONAL RECORDS**—Aveiros (9), Igarapé do Gordão, Ilha da Urucurituba (9), Iroçanga, Itacoatiara, João Pessoa (10), Lago do Baptista (3), Prainha (9).

**MEASUREMENTS**—AGE 35 (6–6) 6; TOTL 43 (57–80) 66.93 [6.79]; TAIL 43 (5–11) 7.11 [24.18]; FOOT 43 (11–15) 13.51 [9.74]; FA 41 (38–44) 40.52 [3.62]; GLS 30 (21.66–23.67) 22.65 [2.14]; CIL 32 (19.43–21.59) 20.37 [2.44]; ZB 39 (8.4–10.1) 9.24 [3.53]; IOB 36 (5.02–5.83) 5.38 [3.6]; BCW 34 (8.9–9.84) 9.46 [2.68]; CD 29 (9.35–10.3) 9.81 [2.58]; MAST 32 (10.23–11.34) 10.83 [2.63]; PAL 36 (9.04–10.85) 10 [4.42]; GMB 32 (7.18–8.05) 7.68 [2.99]; UTR 39 (7.86–8.83) 8.33 [3.40]; MNTR 41 (7.86–8.94) 8.43 [3.43].

Specimens were collected in a hole in the ground (one from Lago do Baptista), a hole in a dead tree in igapó forest (Ilha da Urucurituba, all taken on 15 August 1934), a hole in a live tree in virgin forest (Iroçanga), or a hole in a dead tree in secondary growth (Aveiros, all taken on 1 March 1934). The 10 specimens from João Pessoa were collected over seven days in July 1936. Carriker (in Allen, 1911) reported this species roosting in well-lit sites such as the lofts of houses, the outer portions of mine tunnels, and under railway culverts. Pine (1972) gave an exhaustive summary of known types of roosting sites for this species.

### **Rhinophylla pumilio** Peters, 1865

**FIELD NUMBER**—2520 ♂.

**DISTRIBUTIONAL RECORD**—Santo Antônio.

**MEASUREMENTS**—AGE 6; TOTL 60; TAIL  $\phi$ ; FOOT 10; FA 33; GLS 19.02; CIL 17.07; ZB  $\phi$ ; IOB 4.53; BCW 8.14; CD 8.59; MAST 8.86; PAL  $\phi$ ; GMB  $\phi$ ; UTR 6.41; MNTR  $\phi$ .

All of the 61 *R. pumilio* collected by the Smithsonian Venezuelan Project were taken near streams and in other moist areas, usually in evergreen forest (Handley, 1976).

### Subfamily STENODERMATINAE

#### **Sturnira tildae** de la Torre, 1959

**FIELD NUMBER**—980 ♀.

**DISTRIBUTIONAL RECORD**—Codajáz.

**MEASUREMENTS**—AGE 6; TOTL 70; FOOT 16; FA 47; GLS 23.5; CIL 21.75; ZB 14.19; IOB  $\phi$ ; BCW 11.07; CD 11.5; MAST  $\phi$ ; PAL 9.89; GMB 8.21; UTR 7.81; MNTR 8.07.

The animal was collected inside a house.

#### **Uroderma bilobatum** Peters, 1866

**FIELD NUMBERS**—1024 ♂, 1025 ♀, 1026 ♂, 983 ♂, 984 ♀, 985 ♀, 986 ♀, 995 ♀, 996 ♂ / 255 ♂, 256 ♀, 301 ♂ / 1483 ♂ / 330 ♀.

**DISTRIBUTIONAL RECORDS**—Codajáz (9), Iroçanga (3), Lago do Baptista, Patinga.

**MEASUREMENTS**—AGE 9 (6–6) 6; TOTL 14 (60–67) 62.57 [3.99]; TAIL  $\phi$ ; FOOT 14 (10–14) 12.21 [8.6]; FA 14 (37–45) 42.04 [4.58]; GLS 11 (22.22–24.17) 23.08 [2.59]; CIL 10 (19.95–22.11) 20.67 [3.17]; ZB 12 (12.03–13.29) 12.6 [3.18]; IOB 13 (5.02–5.96) 5.45 [5.25]; BCW 9 (9.23–10.03) 9.6 [2.81]; CD 9 (9.96–11.7) 10.55 [4.86]; MAST 9 (10.46–11.48) 10.96 [2.79]; PAL 14 (11.12–12.15) 11.5 [2.73]; GMB 12 (8.49–9.14) 8.86 [2.04]; UTR 14 (8.44–9.31) 8.83 [2.32]; MNTR 14 (8.5–9.3) 8.77 [2.59].

Specimens were taken from the leaves of a palm tree in the forest (Lago do Baptista), from the leaves of “burity” (= *Mauritia flexuosa*; Patinga), or from banana trees (Iroçanga). Carriker (in Allen, 1911) stated that they never enter caves or hollow trees. Specimens collected the same day included numbers 1024–1026 (1 ♂, 2 ♀♀), 983–986 (1 ♂, 3 ♀♀), 995 and 996 (2 ♀♀), and 255 and 256 (1 ♂, 1 ♀), each group containing no more than one male. However, Goodwin and Greenhall (1961) noted as many as four (nonbreeding) males in a single roost in Trinidad.

All of these specimens fall within the range of *Uroderma bilobatum bilobatum* (Davis, 1968). None exhibits the laterally expanded nasal septum (mesethmoid bone) that Davis (1968) used to distinguish *Uroderma magnirostrum* from *U. bilobatum*. Means of measurements above are close to those reported for *U. bilobatum* from Ilha de Maracá in the state of Roraima (Taddei and Reis, 1980), but measurements presented by the same authors for a single *U. magnirostrum* also fall within the above ranges.

#### **Vampyressa macconnelli** (Thomas, 1901)

**FIELD NUMBER**—7416 ♂.

**DISTRIBUTIONAL RECORD**—Prainha.

MEASUREMENTS—AGE  $\phi$ ; TOTL 50; FOOT 11; FA 33; GLS 17.99; CIL 15.83; ZB 10.2; IOB 4.5; BCW  $\phi$ ; CD 8.08; MAST 9.22; PAL 7.76; GMB 7.01; UTR 6.83; MNTR 6.65.

This specimen was taken in a rolled-up leaf in virgin forest. In other instances, these bats have been observed in hollow trees or in "tents" formed from incised palm leaves (Emmons, 1990). Although Reis and Peracchi (1987) found this species in both primary- and secondary-growth forests near Manaus, it was more abundant in the latter. Generic allocation of this species follows Baker et al. (1973) and Owen (1987); according to the taxonomy of Jones and Carter (1976) and Williams and Genoways (1980), it represents the nominate race.

### *Dermanura anderseni* Osgood, 1916

FIELD NUMBERS—1006 ♀, 1007 ♂, 1008 ♀, 1009 ♀.

DISTRIBUTIONAL RECORD—Codajáz (4).

MEASUREMENTS—AGE 4 (5–6) 5.75; TOTL 4 (46–56) 49.75; FOOT 4 (11–11) 11; FA 4 (36–37) 36.63; GLS 4 (17.93–18.24) 18.07; CIL 4 (15.75–16.36) 16.08; ZB 2 (10.69–10.9) 10.80; IOB 4 (4.41–4.81) 4.58; BCW 4 (8.51–8.79) 8.64; CD 3 (8.76–9.27) 9.06; MAST 4 (9.29–9.68) 9.42; PAL 4 (7.58–7.86) 7.74; GMB 4 (7.34–7.73) 7.54; UTR 4 (6.33–6.56) 6.48; MNTR 4 (6.09–6.16) 6.12.

Other records of *D. anderseni* in the Amazon Basin include Borba on the Rio Madeira (Handley, 1987). AMO 1006 was pregnant when captured on 2 June 1935; the remaining animals were taken the following day, when one of the females was lactating.

### *Dermanura gnomus* Handley, 1987

FIELD NUMBER—285 ♂.

DISTRIBUTIONAL RECORD—Iroçanga.

MEASUREMENTS—AGE 6; TOTL 52; FOOT 10; FA 37; GLS 18.32; CIL 16.31; ZB  $\phi$ ; IOB 4.8; BCW 8.53; CD 9.34; MAST 9.53; PAL 7.74; GMB  $\phi$ ; UTR 4.1; MNTR 6.11.

The presence of the vestigial  $m_3$  and the swollen supraorbital region identify this bat as a member of the *glaucus* group (Handley, 1987). Handley (1987) recorded *D. gnomus* from Belém (Pará) and Serra do Roncador (Mato Grosso), but indicated that it ranged more widely through Brazilian Amazonia. The Iroçanga locality lies 750 km W of Belém.

### *Koopmania concolor* Peters, 1865

FIELD NUMBERS—1114 ♀, 1115 ♂, 1116 ♀, 1119 ♀.

DISTRIBUTIONAL RECORD—Manaus (4).

MEASUREMENTS—AGE 4 (6–6) 6; TOTL 4 (60–70) 64; FOOT 4 (11–14) 12.75; FA 4 (46–49) 48; GLS 4 (22.11–22.46) 22.24; CIL 3 (19.3–19.74) 19.59; ZB 3 (12.98–13.65) 13.36; IOB 4 (5.43–5.68) 5.53; BCW 4 (9.8–10.33) 10.02; CD 4 (10.47–11.66) 10.94; MAST 4 (11.34–11.77) 11.58; PAL 4 (9.65–9.99) 9.85; GMB 4 (9.1–9.68) 9.39; UTR 4 (8.17–8.3) 8.24; MNTR 4 (7.64–8.46) 8.08.

AMO 1115 and 1116 were taken on the same day (20 September 1935). Reis and Peracchi (1987) reported this species from both primary- and secondary-growth forests near Manaus. Koopman (1978) considered it rare. The genus *Koopmania* was erected by Owen (1991) for the distinctive species customarily referred to *Artibeus* or *Dermanura*.

### *Artibeus jamaicensis* Leach, 1821

FIELD NUMBER—1582 ♀.

DISTRIBUTIONAL RECORD—Lago do Baptista.

MEASUREMENTS—AGE 6; TOTL 85; FOOT 20; FA 61; GLS 29.78; CIL 26.35; ZB 18.24; IOB 6.77; BCW 12.95; CD 13.6; MAST 15.63; PAL 13.74; GMB 13.63; UTR 11.74; MNTR 12.06.

Reis and Peracchi (1987) reported this species from both primary- and secondary-growth forests near Manaus.

### *Artibeus lituratus* (Olfers, 1818)

FIELD NUMBERS—1041 ♀, 1042 ♀, 1050 ♀.

DISTRIBUTIONAL RECORD—Codajáz (3).

MEASUREMENTS—AGE 6; TOTL 3 (100–100) 100; FOOT 3 (19–20) 19.67; FA 3 (70–75) 72.67; GLS  $\phi$ ; CIL  $\phi$ ; ZB 18.31; IOB 6.32; BCW 13.86; CD  $\phi$ ; MAST  $\phi$ ; PAL 14.06; GMB 13.33; UTR 2 (11.77–12.62) 12.20; MNTR 2 (12.21–13.05) 12.63.

These animals were collected while they were hanging from leaves in the forest at a height of 4 m (1041 and 1042, taken the same day) and 3 m (1050). Taddei (1983) noted that this species roosts during the day in groups of up to 12 individuals, of both sexes, in the crowns of various species of trees, as well as on the ventral surface of banana leaves. Reis and Peracchi (1987) reported this species from both primary- and secondary-growth





FIG. 4. External appearance of *Ametrida centurio* (AMO 1082). White bar = 1 cm.

forests near Manaus, and Taddei (1983) noted its occurrence in urban areas.

#### *Artibeus obscurus* (Schinz, 1821)

FIELD NUMBER—586 ♂.

DISTRIBUTIONAL RECORD—Ilha da Urucurituba.

MEASUREMENTS—AGE ♂; TOTL 75; FOOT 15; FA 62; GLS ♂; CIL ♂; ZB ♂; IOB 6.35; BCW ♂; CD ♂; MAST ♂; PAL ♂; GMB 12.4; UTR 11.38; MNTR 11.23.

This animal was taken from a hole in a dead tree in igapó forest. It agrees well with Handley's (1989) redescription of bats that have been referred to as *Artibeus fuliginosus*, having dark lips, absent facial stripes, naked interfemoral membrane, frosted ventral pelage, and subparallel supraorbital margins.

#### *Ametrida centurio* Gray, 1847

FIELD NUMBERS—433 ♂ / 1082 ♂.

DISTRIBUTIONAL RECORDS—Codajáz, Santarém.

MEASUREMENTS—AGE 6; TOTL 2 (47–50) 48.5; TAIL ♂; FOOT 2 (11–12) 11.5; FA 2 (32–32) 32; GLS 14.89; CIL 11.99; ZB 10.56; IOB

3.39; BCW 8.64; CD ♂; MAST 8.68; PAL 3.2; GMB 7.17; UTR 4.89; MNTR 5.

These specimens were encountered inside a large leaf in forest (Santarém) and inside a house, flying at night (Codajáz). Reis and Peracchi (1987) reported this species from both primary- and secondary-growth forests near Manaus. Emmons (1990) considered it rare. Its distinctive cranial morphology is shown in Figure 4.

#### Family DESMODONTIDAE

##### *Desmodus rotundus* (É. Geoffroy, 1810)

FIELD NUMBERS—1546 ♀ / 50 ♂, 51 ♀.

DISTRIBUTIONAL RECORDS—Igarapé Anibá, Iroçanga (2).

MEASUREMENTS—AGE 3 (6–6) 6; TOTL 3 (80–92) 85.67; FOOT 3 (19–20) 19.67; FA 3 (58–58) 58; GLS 3 (24.05–24.72) 24.35; CIL 3 (21.41–21.57) 21.47; ZB 3 (12.13–12.23) 12.19; IOB 3 (5.38–5.76) 5.56; BCW 3 (11.99–12.53) 12.27; CD 3 (12.62–13.15) 12.93; MAST 3 (12.17–12.57) 12.35; PAL 3 (8.92–9.4) 9.16; GMB ♂; UTR 3 (5.71–5.98) 5.87; MNTR 3 (6.17–6.35) 6.28.

Specimens were collected while flying inside a house at night (Igarapé Anibá), or from a hole in a live tree in virgin forest (both from Iroçanga). Reis and Peracchi (1987) reported common vam-

pires from primary- (75%) and secondary-growth (25%) habitats near Manaus.

## Family FURIPTERIDAE

### *Furipterus horrens* (F. Cuvier, 1828)

FIELD NUMBER—7447 ♂.

DISTRIBUTIONAL RECORD—Prainha.

MEASUREMENTS—AGE 6; TOTL 25; TAIL 10; FOOT 9; FA 34; GLS  $\phi$ ; CIL  $\phi$ ; ZB 7.49; IOB 3.17; BCW 6.15; CD  $\phi$ ; MAST 6.42; PAL  $\phi$ ; GMB  $\phi$ ; UTR  $\phi$ ; MNTR 5.72.

A butterfly net was used to capture this specimen while flying early in the evening. Emmons (1990) reported them as roosting in caves, fallen logs, and deep cracks in rocks. All six captures of this species by the Smithsonian Venezuelan project took place near streams and in other moist areas (Handley, 1976).

## Family THYROPTERIDAE

### *Thyroptera discifera*

Lichtenstein and Peters, 1855

FIELD NUMBER—358 ♂, 359 ♀.

DISTRIBUTIONAL RECORD—Aveiros (2).

MEASUREMENTS—AGE 2 (6–6) 6; TOTL 2 (50–60) 55; TAIL 2 (19–20) 19.50; FOOT 2 (6–6) 6; FA 2 (33–33) 33; GLS 2 (14.35–14.38) 14.36; CIL 2 (13.24–13.43) 13.33; ZB 6.98; IOB 2 (2.43–2.55) 2.49; BCW 2 (6.55–6.59) 6.57; CD 2 (6.41–6.48) 6.44; MAST 2 (6.74–6.79) 6.76; PAL 2 (7.29–7.37) 7.33; GMB 2 (4.87–4.98) 4.92; UTR 2 (6.72–6.76) 6.74; MNTR 2 (6.65–6.73) 6.69.

Both specimens were secured the same day from the leaves of banana trees, a typical roosting site for this genus (Taddei, 1988). Rolled *Heliconia* leaves are also frequently utilized (Handley, 1976). Wilson (1978) reviewed the biology of Peters's disk-winged bat and presented an approximate Brazilian distribution that stopped well north of the mouth of the Amazon. Specimens of this poorly known species from the Rio Tapajós represent the southernmost records for eastern Brazil. Their pelage is redder, with creamier underfur, than in specimens of this species from Colombia.

### *Thyroptera tricolor* Spix, 1823

FIELD NUMBER—1081 ♀.

DISTRIBUTIONAL RECORD—Codajáz.

MEASUREMENTS—AGE  $\phi$ ; TOTL 64; TAIL 24; FOOT 7; FA 34; GLS  $\phi$ ; CIL 14.01; ZB  $\phi$ ; IOB 2.63; BCW 7.44; CD 7; MAST  $\phi$ ; PAL 7.33; GMB 5.40; UTR 7; MNTR 6.75.

The single specimen was secured from the leaves of a banana tree. Reis and Peracchi (1987) reported this species from both primary- and secondary-growth forests near Manaus. According to Wilson and Findley (1977), the nominate race of Spix's disk-winged bat occurs throughout much of the lower Amazon Basin.

## Family VESPERTILIONIDAE

### *Myotis nigricans* (Schinz, 1821)

FIELD NUMBER—2405 ♀.

DISTRIBUTIONAL RECORD—Igarapé Grande.

MEASUREMENTS—AGE 6; TOTL 85; TAIL 35; FOOT 8; FA 35; GLS 14.03; CIL 13.08; ZB  $\phi$ ; IOB 3.53; BCW 6.89; CD 6.19; MAST 6.76; PAL 6.39; GMB 5.60; UTR 6.23; MNTR 6.29.

LaVal (1973, p. 6) stated that "Any specimen [of Neotropical *Myotis*] that does not fit the diagnosis of another species is probably *nigricans*." There is thus some uncertainty as to whether all bats currently recognized as *nigricans* are conspecific. Previous records of *nigricans* in the Amazon Basin are at Leticia, Colombia (LaVal, 1973) and Manaus (Reis and Peracchi, 1987).

### *Myotis simus* Thomas, 1901

FIELD NUMBERS—1593 ♂ / 254 ♀ / 430 ♂, 431 ♀, 432 ♀.

DISTRIBUTIONAL RECORDS—Igarapé Anibá, Iroçanga, Santarém (3).

MEASUREMENTS—AGE 2 (6–6) 6; TOTL 5 (70–89) 81.4 [8.93]; TAIL 5 (23–34) 31.4 [15.21]; FOOT 5 (8–9) 8.2 [5.45]; FA 5 (36–39) 37.4 [3.05]; GLS  $\phi$ ; CIL 6.5; ZB 9.34; IOB 2 (3.94–4.05) 4; BCW 2 (7.05–7.3) 7.18; CD 2 (6.4–6.71) 6.56; MAST 2 (7.57–7.81) 7.69; PAL 6.67; GMB 2 (5.55–5.67) 5.61; UTR 6.09; MNTR 2 (6.33–6.57) 6.45.

These specimens were collected at nightfall while flying (Igarapé Anibá), from the leaves of a banana

tree (Iroçanga), or from a hole in a live tree in igapó forest, roosting with *Noctilio albiventris* (all from Santarém). Myers and Wetzel (1979) also remarked on roosting associations of *M. simus* and lesser noctilios.

Although most other records of this species come from the Brazilian Amazon (LaVal, 1973), the species is also known from Bolivia (Anderson et al., 1982), Paraguay (Myers and Wetzel, 1979), Argentina (Fornes, 1972), and lowland Perú (Koopman, 1978).

### ***Myotis albescens* (É. Geoffroy, 1806)**

FIELD NUMBERS—406 ♂, 407 ♂, 408 ♂, 409 ♂, 410 ♀, 411 ♀, 412 ♀, 413 ♀ / 557 ♂, 558 ♂, 559 ♂, 560 ♂, 561 ♂, 562 ♂, 563 ♂, 564 ♂, 565 ♂, 566 ♂, 567 ♀, 568 ♀, 569 ♀, 570 ♀, 571 ♀, 572 ♀, 573 ♀, 574 ♀ / 1581 ♂ / 422 ♂, 423 ♂, 424 ♀, 425 ♀, 426 ♀, 427 ♀.

DISTRIBUTIONAL RECORDS—Aveiros (8), Ilha da Urucurituba (18), Lago do Baptista, Santarém (6).

MEASUREMENTS—AGE 23 (6–6) 6; TOTL 31 (75–85) 81.81 [3.12]; TAIL 32 (25–35) 30.88 [9.62]; FOOT 32 (8–10) 9.03 [9.53]; FA 32 (33–38) 34.42 [3.4]; GLS 20 (13.62–14.51) 14.02 [1.63]; CIL 22 (12.64–13.51) 12.99 [1.75]; ZB 4 (7.76–8.72) 8.22; IOB 30 (3.71–4.21) 3.9 [3.13]; BCW 25 (6.89–7.47) 7.16 [2.47]; CD 20 (6.08–6.71) 6.43 [2.56]; MAST 20 (7.09–7.5) 7.28 [1.39]; PAL 28 (6.06–7.11) 6.41 [3.96]; GMB 30 (5.04–5.59) 5.36 [2.69]; UTR 31 (5.72–6.2) 5.93 [2.27]; MNTR 32 (5.88–6.59) 6.21 [2.58].

Specimens were collected from a hole in a dead palm within sight of the river (all from Aveiros, on 20 June 1934), between planks on a bridge (423–427, one with young, on 30 June 1934, at Santarém), and inside a rotten log (all from one day at Ilha da Urucurituba). The species is also known to roost in rocks (Handley, 1976).

Its distinctive postorbital constriction and palatal breadth make *M. albescens* one of the most distinctive Neotropical *Myotis* (LaVal, 1973). Abundantly represented in collections, *M. albescens* has been recorded from a number of localities along the Amazon and Tapajós rivers.

### ***Eptesicus furinalis chapmani***

J. A. Allen, 1915

FIELD NUMBER—590 ♀.

DISTRIBUTIONAL RECORD—Ilha da Urucurituba.

MEASUREMENTS—AGE ♂; TOTL 100; TAIL 35; FOOT 9; FA 41; GLS ♂; CIL 14.98; ZB ♂; IOB 3.63; BCW ♂; CD ♂; MAST ♂; PAL 7.29; GMB 6.72; UTR 6.21; MNTR 6.86.

Specimens in the AMNH record this species on the Madeira and Tapajós rivers, as well as on the north bank of the Amazon. Skull measurements above are those of AMO 1437, which has apparently become mismatched with the skin of AMO 590.

### ***Eptesicus brasiliensis melanopterus* (Jentink, 1904)**

FIELD NUMBER—1437 ♂.

DISTRIBUTIONAL RECORD—Itacoatiara.

MEASUREMENTS—AGE 6; TOTL 92; TAIL 32; FOOT 10; FA 40; GLS 16.21; CIL 15.25; ZB ♂; IOB 3.82; BCW 7.44; CD 7.31; MAST 8.66; PAL 7.44; GMB 6.88; UTR 6.58; MNTR 6.93.

Skull measurements above are those of AMO 590, which has apparently become mismatched with the skin of AMO 1437. Near Manaus, *E. brasiliensis* is known from primary forests (Reis and Peracchi, 1987).

### ***Lasiurus ega* (Gervais, 1856)**

FIELD NUMBERS—591 ♂, 592 ♀, 593 ♀.

DISTRIBUTIONAL RECORD—Ilha da Urucurituba (3).

MEASUREMENTS—AGE 3 (6–6) 6; TOTL 3 (118–132) 124.67; TAIL 3 (48–64) 56.67; FOOT 3 (10–11) 10.67; FA 3 (48–49) 48.5; GLS 3 (15.72–16.84) 16.45; CIL 3 (14.62–15.93) 15.48; ZB 2 (10.77–11.6) 11.19; IOB 2 (4.5–4.78) 4.64; BCW 3 (8.4–8.67) 8.58; CD 3 (8.36–8.57) 8.46; MAST 3 (8.5–9.24) 8.97; PAL 3 (6.23–7.06) 6.74; GMB 2 (7.27–7.57) 7.42; UTR 3 (5.53–6.14) 5.85; MNTR 3 (6.8–7.46) 7.12.

Specimens were collected on a single day from the leaves of a dead banana tree. Goodwin and Greenhall (1961) reported finding three individuals under a thatched roof. Taddei (1988) observed that the yellowish pelage of this species matches the color of the fallen and dried leaves of palms in which it roosts.

## Family MOLOSSIDAE

### *Cynomops planirostris planirostris* (Peters, 1865)

FIELD NUMBER—1409 ♂.

DISTRIBUTIONAL RECORD—Itacoatiara.

MEASUREMENTS—AGE 6; TOTL 85; TAIL 30; FOOT 8; FA 32.5; GLS ♂; CIL 16.62; ZB ♂; IOB 4.35; BCW 8.9; CD ♂; MAST ♂; PAL 7.74; GMB 7.58; UTR 7.72; MNTR 7.19.

In contrast to certain molossids that frequently roost in human habitations, this species (as well as related species in *Molossops*) is considered to be mainly phytophilous (Taddei, 1983). Only 2% of 241 captures Handley (1976) reported from Venezuela were of commensals. Myers and Wetzel (1983) treated specimens from Para as belonging to the subspecies *paranus*, described by Thomas (1901).

### *Eumops auripendulus auripendulus* (Shaw, 1800)

FIELD NUMBERS—221 ♂, 222 ♂, 223 ♂, 224 ♂, 231 ♂, 232 ♂, 233 ♀, 234 ♀, 235 ♀, 236 ♀, 237 ♀, 238 ♀, 239 ♀, 240 ♀, 241 ♀, 242 ♀, 243 ♀, 244 ♀, 245 ♀, 264 ♂, 265 ♂, 266 ♂, 267 ♂, 268 ♀, 269 ♀, 270 ♀, 271 ♀, 272 ♀, 273 ♀, 274 ♀, 275 ♀, 286 ♂, 287 ♂, 288 ♀, 289 ♀, 290 ♀, 292 ♀, 7463 ♀ / 1198 ♂.

DISTRIBUTIONAL RECORDS—Iroçanga (38), Itaboca.

MEASUREMENTS—AGE 32 (4–6) 5.81; TOTL 39 (101–136) 125.92 [5.16]; TAIL 39 (35–45) 40.23 [6.53]; FOOT 39 (14–15) 14.53 [3.47]; FA 31 (55–60) 57.38 [2.31]; GLS 29 (23.64–25.92) 24.72 [2.25]; CIL 31 (22.18–23.48) 22.9 [1.75]; ZB 35 (12.89–14.94) 14.11 [2.96]; IOB 37 (4.16–4.97) 4.64 [3.55]; BCW 32 (10.48–11.48) 11.07 [2.38]; CD 9 (9.33–10.85) 10.03 [4.54]; MAST 27 (11.77–12.72) 12.22 [1.88]; PAL 37 (9.81–11.21) 10.64 [3.02]; GMB 37 (9.67–10.52) 10.02 [1.76]; UTR 28 (9.95–11.09) 10.42 [2.65]; MNTR 37 (10.16–10.95) 10.45 [1.84].

The Iroçanga specimens were collected from the bases of leaves high up in palm trees (“palmeira muçajá”) and from a hole in a live tree in virgin forest. The former roosting association seems a noteworthy addition to the tree holes, cliffs, and roofs of houses noted by Emmons (1990). The origins of commensal roosting sites of molossids may be explicable by a transition from dead leaves

on trees to dead leaves on (thatched) houses. All roosts of this species are located high off the ground because its large size apparently precludes take-off from a level surface (Emmons, 1990). Specimens from Iroçanga were collected on four days, in the following series: 221–224 (all ♂♂), 231–243 (2 ♂♂, 11 ♀♀), 270–275 (6 ♀♀), and 286–292 and 7463 (2 ♂♂, 5 ♀♀).

Eger (1977) gave the range of typical *auripendulus* as extending throughout much of the northern half of South America.

### *Eumops glaucinus glaucinus* (Wagner, 1843)

FIELD NUMBERS—1180 ♀, 1181 ♀, 1182 ♀, 1183 ♂, 1184 ♂, 1185 ♀, 1186 ♂, 1187 ♂ / 1638 ♂, 1639 ♂, 1640 ♂, 1641 ♀, 1642 ♀ / 2527 ♀, 2528 ♀, 2529 ♀, 2530 ♀.

DISTRIBUTIONAL RECORDS—Itaboca (8), Lago Tapayuna (5), Santo Antônio (4).

MEASUREMENTS—AGE 14 (5–6) 5.64; TOTL 17 (120–145) 135.29 [4.97]; TAIL 17 (40–55) 49 [6.49]; FOOT 17 (12–15) 13.94 [8.2]; FA 17 (54–59) 56.97 [2.12]; GLS 8 (23.85–25.13) 24.37 [1.86]; CIL 12 (22.36–24.31) 23.49 [2.52]; ZB 15 (13.31–15.43) 14.41 [4.5]; IOB 17 (4.85–5.22) 5.02 [2.09]; BCW 14 (10.41–11.92) 11.18 [3.32]; CD 10.46; MAST 14 (12.3–13.39) 12.93 [2.23]; PAL 17 (9.46–10.68) 10.09 [3.8]; GMB 14 (9.32–10.61) 9.98 [4.01]; UTR 17 (9.68–11.09) 10.59 [3.18]; MNTR 17 (10.13–10.92) 10.58 [2.02].

Specimens collected the same day were 1181–1182 (2 ♀♀), 1183–1186 (3 ♂♂, 1 ♀), 1638–1642 (2 ♂♂, 3 ♀♀), and 2527–2530 (4 ♀♀). Those from Lago Tapayuna were collected from a hole in a dead palm at the edge of water.

Although Eger (1977) listed no Brazilian records of *E. glaucinus* west of Faro on the Amazon River (56°44'W), she correctly inferred its range throughout much of western Brazil. Specimens from the Purus and Juruá rivers do not differ significantly from those in eastern Brazil, as is evident from inspection of coefficients of variation for combined locality records.

### *Eumops perotis trumbulli* (Thomas, 1901)

FIELD NUMBERS—2230 ♀, 2386 ♂, 2445 ♂.

DISTRIBUTIONAL RECORD—João Pessoa (3).

MEASUREMENTS—AGE 3 (5–5) 5; TOTL 3 (145–151) 147; TAIL 3 (45–50) 46.66; FOOT 3 (16–17) 16.33; FA 3 (65–71) 68.67 [4.68]; GLS 2 (28.1–29.14) 28.62; CIL 27.79; ZB 2 (16.19–16.78) 16.48; IOB 2 (4.93–5.04) 4.98; BCW 11.51; CD 11.25; MAST 2 (14.07–14.23) 14.15; PAL 2 (11.95–12.92) 12.43; GMB 2 (10.89–11.38) 11.13; UTR 3 (11.91–12.58) 12.26; MNTR 2 (11.65–12.58) 12.11.

Olalla took these specimens in July, August, and September 1936.

Eger (1977) recognized *trumbulli* as a distinct species (but see Koopman, 1978; Honacki et al., 1982). She gave its range as extending throughout most of the Amazon Basin. Specimens here average distinctly smaller than specimens of *E. perotis* reported by Myers and Wetzel (1983) from the Chaco Boreal, which presumably represent the nominate subspecies.

### **Molossus molossus** (Schreber, 1774)

FIELD NUMBERS—2303 ♀ / 202 ♂, 203 ♂, 204 ♀, 205 ♀, 206 ♀, 207 ♀, 208 ♀ / 1117 ♂, 1118 ♂, 1120 ♀ / 7453 ♀.

DISTRIBUTIONAL RECORDS—Igarapé do Gordão, Iroçanga (7), Manaus (3), Prainha.

MEASUREMENTS—AGE 12 (5–6) 5.79; TOTL 12 (96–112) 102.67 [4.03]; TAIL 12 (34–40) 37.25 [6.49]; FOOT 12 (10–12) 10.33 [6.3]; FA 12 (38–42) 40 [3.02]; GLS 8 (16.84–17.84) 17.22 [2.01]; CIL 10 (15.52–16.81) 16.02 [2.59]; ZB 9 (10–11.24) 10.68 [3.35]; IOB 10 (3.32–3.88) 3.69 [4.63]; BCW 12 (8.77–9.3) 9.06 [2.06]; CD 6 (7.64–8.51) 8.19 [3.89]; MAST 11 (9.87–10.82) 10.39 [2.81]; PAL 11 (5.7–6.55) 6.04 [4.27]; GMB 10 (7.47–8) 7.76 [2.4]; UTR 12 (6.57–7.13) 6.85 [2.27]; MNTR 12 (6.83–7.43) 7.11 [2.24].

Specimens were collected from holes in dead trees in fields (Iroçanga and Prainha) and from inside a church (Igarapé do Gordão). AMO 202–208 (2 ♂, 5 ♀) were all taken the same day. Taddei (1983) noted that these bats frequently roost in human habitations.

### **Molossus rufus** É. Geoffroy, 1805

FIELD NUMBERS—7491 ♀ / 73 ♀, 74 ♀, 75 ♀, 76 ♀, 77 ♀, 78 ♀, 79 ♀, 80 ♀, 81 ♀, 88 ♂, 89 ♂, 90 ♂, 91 ♀, 92 ♀, 93 ♀, 94 ♀, 101 ♂, 102 ♀, 117 ♂, 118 ♂, 119 ♂, 120 ♂, 121 ♂, 122 ♂, 123 ♂, 124 ♂, 125 ♂, 126 ♀, 127 ♀, 128 ♀, 129 ♀, 130 ♀, 131 ♀, 132 ♀, 133 ♀, 134 ♀, 135 ♀, 136 ♀, 137 ♀, 138 ♀, 139 ♀, 140 ♀,

141 ♀, 142 ♀, 143 ♀, 246 ♀ / 1382 ♂, 1383 ♂, 1384 ♂ / 1634 ♂, 1635 ♂, 1636 ♂, 1637 ♀ / 652 ♂, 653 ♀, 654 ♀, 655 ♀, 656 ♀ / 7449 ♂, 7450 ♂, 7451 ♂, 7452 ♂ / 2499 ♂, 2500 ♂, 2501 ♂, 2502 ♂, 2503 ♀, 2504 ♀, 2505 ♀, 2547 ♀, 2558 ♂, 2559 ♂, 2560 ♂, 2561 ♀, 2562 ♀, 2563 ♀, 2564 ♀, 2565 ♀.

DISTRIBUTIONAL RECORDS—Aveiros, Iroçanga (46), Itacoatiara (3), Lago Tapayuna (4), Pataua (5), Prainha (4), Santo Antônio (16).

MEASUREMENTS—AGE 63 (5–6) 5.87; TOTL 78 (116–153) 129.66 [5.11]; TAIL 78 (19–55) 46.53 [10.41]; FOOT 78 (14–19) 15.28 [6.27]; FA 79 (47–53) 50.04 [2.70]; GLS 54 (17.62–24.31) 22.37 [4.85]; CIL 54 (19.15–21.56) 20.02 [3.16]; ZB 43 (12.98–14.62) 13.8 [3.4]; IOB 72 (4.06–4.94) 4.45 [4.17]; BCW 60 (10.29–11.61) 10.94 [2.57]; CD 31 (9.92–12.53) 11.12 [6.02]; MAST 59 (12.33–14.69) 13.42 [3.84]; PAL 78 (6.68–8.63) 7.42 [4.65]; GMB 76 (9.02–10.47) 9.92 [3.1]; UTR 79 (7.15–8.45) 7.68 [3.15]; MNTR 79 (8.09–9.53) 8.9 [3.46].

Specimens were collected from a hole in a live tree in virgin forest, in igapó, in a dead tree in a field, and in a dead tree in secondary growth. Specimens collected on the same day in the same locality were AMO 73–81 (9 ♀♀), AMO 88–94 and 101–102 (4 ♂♂, 5 ♀♀), AMO 117–143 (9 ♂♂, 18 ♀♀), AMO 1382–1384 (3 ♂♂), AMO 1634–1637 (3 ♂♂, 1 ♀), AMO 652–656 (1 ♂, 4 ♀♀), AMO 7449–7452 (4 ♂♂), AMO 2499–2505 (4 ♂♂, 3 ♀♀), and AMO 2558–2565 (3 ♂♂, 5 ♀♀).

### Order RODENTIA Family SCIURIDAE

#### **Sciurillus pusillus glaucinus** Thomas, 1914

FIELD NUMBERS—317 ♂, 318 ♀, 329 ♀.

DISTRIBUTIONAL RECORD—Patinga (3).

MEASUREMENTS—AGE 3 (1–2) 1.66; TOTL 3 (200–205) 201.66; TAIL 3 (100–100) 100; FOOT 3 (24–25) 24.66; GLS 2 (26.96–27.34) 27.15; CIL 3 (23.76–24.33) 24; NL 3 (6.74–7.93) 7.32; ZB 2 (18.5–19.3) 18.9; IOB 3 (11.18–12.01) 11.48; BCW 2 (14.51–14.56) 14.53; CD 3 (13.38–13.94) 13.59; PTL 3 (10.14–10.55) 10.33; MTR 3 (4.58–4.72) 4.66.

Olalla (1935) reported measurements and other biological information on these same specimens. A skull is shown in Figure 5. Externally, the venter and inner margins of the ear pinnae of specimens from Patinga are washed with fulvous, and, in these respects, resemble typical *pusillus*. However,



FIG. 5. Cranium and mandible of *Sciuirillus pusillus* (AMO 317). White bar = 5 mm.

grayish brown color, same-colored crown, and short tail hairs ally these specimens with *glaucinus* (see Anthony and Tate, 1935). The type locality of *glaucinus* lies to the north of the Rio Amazonas at the Great Falls on the Demerara River, Guyana.

### *Microsciurus flaviventer* (Gray, 1867)

FIELD NUMBERS—2415 ♀ / 2317 ♀ / 2103 ♂, 2104 ♂, 2105 ♂, 2106 ♀, 2248 ♂, 2250 ♂, 2382 ♂ / 1218 ♀.

DISTRIBUTIONAL RECORDS—Igarapé Grande, Igarapé do Gordão, João Pessoa (7), Jaburu.

MEASUREMENTS—AGE 8 (1–3) 2.12 [39.27]; TOTL 8 (271–295) 278.87 [2.66]; TAIL 8 (126–140) 133.12 [4.04]; FOOT 8 (41–45) 42.37 [2.8]; GLS 5 (36.27–38.69) 37.22 [2.74]; CIL 7 (31.5–33.99) 32.72 [3.1]; NL 8 (9.26–10.71) 10.14 [4.56]; ZB 4 (22.33–23.57) 22.87; IOB 6 (12.75–14.1) 13.44 [3.18]; BCW 5 (17.69–18.87) 18.4 [2.53]; CD 5 (17.61–18.23) 17.93 [1.32]; PTL 7 (15.3–16.33) 15.75 [2.24]; MTR 8 (5.61–6.87) 6.39 [5.56]. **Adults Only**—AGE 6 (2–3) 2.5 [21.9]; TOTL 6 (271–295) 279.16 [3.1]; TAIL 6 (126–140) 131.16 [3.55]; FOOT 6 (41–45) 42.5 [3.24]; GLS 3 (36.69–38.69) 37.75; CIL 5 (32.47–33.99) 33.19 [2.25]; NL 6 (10–10.71) 10.32 [2.99]; ZB 4 (22.33–23.57) 22.87; IOB 4 (13.44–14.1) 13.62; BCW 3 (17.69–18.69) 18.19; CD 3 (17.61–18.23) 17.92; PTL 5 (15.57–16.33) 15.91 [1.79]; MTR 6 (5.61–6.87) 6.42.

Ithering (1904) previously recorded this squirrel from the Rio Juruá under the name *Sciurus peruianus* (Allen).

### *Microsciurus flaviventer manarius* (Thomas, 1920)

FIELD NUMBERS—1010 ♀, 1063 ♂, 1073 ♂, 1074 ♀.

DISTRIBUTIONAL RECORD—Codajáz (4)

MEASUREMENTS—AGE 4 (2–3) 2.25; TOTL 4 (265–285) 277.75; TAIL 4 (120–135) 128.75; FOOT 4 (40–45) 43; GLS 4 (37.65–38.7) 37.99; CIL 4 (32.43–33.77) 33.07; NL 4 (9.95–10.52) 10.20; ZB 2 (23.36–23.7) 23.53; IOB 3 (13.53–14.66) 13.92; BCW 4 (17.6–18.52) 18.08; CD 4 (18.24–19.02) 18.75; PTL 4 (15.33–16.1) 15.84; MTR 4 (5.76–6.63) 6.25.

AMO 1010 was lactating when taken on 3 July 1935. Specimens of *Microsciurus* in the Olalla collections from north of the Rio Solimões lack a P<sup>3</sup>, resembling the animal described by Thomas as *manarius*. However, the taxonomic significance of this character must be questioned, as “loss” characters may be convergently derived and subject to inconstancy, as is known to be true for this same tooth in Holarctic chipmunks (*Neotamias* and *Eutamias*). This record from Codajáz fills a distributional hiatus for dwarf squirrels on the north bank of the central Amazon (cf. Emmons, 1990).

### *Sciurus aestuans* Linnaeus, 1766

FIELD NUMBERS—354 ♀, 355 ♀, 367 ♂, 368 ♀, 369 ♀, 374 ♀, 375 ♀, 7483 ♂, 7492 ♂, 7495 ♂ / 1545 ♀, 1555 ♂ / 1407 ♀, 1428 ♂, 1439 ♀ / 2222 ♂ / 1492 ♀, 1515 ♂ / 1454 ♂, 1457 ♂ / 1616 ♀ / 1121 ♀ / 313 ♂, 314 ♂, 326 ♂ / 144 ♂, 298 ♀, 40 ♂, 42 ♂, 43 ♂, 44 ♀ / 13 ♀, 15 ♀, 35 ♀, 4 ♂, 5 ♀, 6 ♂ / 7399 ♀, 7400 ♂, 7401 ♀, 7402 ♀ / 7406 ♂, 7407 ♂, 7408 ♂, 7411 ♂, 7412 ♂.

DISTRIBUTIONAL RECORDS—Aveiros (10), Igarapé Anibá (2), Itacoatiara (3), João Pessoa, Lago do Baptista (2), Lago do Canaçary (2), Lago Tapayuna, Manaus, Patinga (3), Iroçanga (6), Itapoama (6), Marai (4), Prainha (5), Cametá (5).

MEASUREMENTS—AGE 44 (1–3) 2.19; TOTL 44 (230–435) 347.9 [7.98]; TAIL 44 (121–210) 172.4 [9.65]; FOOT 45 (41–52) 47.64 [4.34]; GLS 33 (44.03–47.17) 45.55 [1.75]; CIL 36 (37.72–41.9) 40.17 [2.55]; NL 38 (11.02–13.74) 12.81 [5.19]; ZB 31 (23.02–28.18) 26.64 [3.69]; IOB 39 (14.13–16.55) 15.19 [3.13]; BCW 37 (18.62–20.65) 19.75

[2.68]; CD 36 (19.58–21.96) 20.78 [2.13]; PTL 41 (17.75–21.24) 19.63 [3.77]; MTR 44 (6.86–8.05) 7.38 [3.78]. **Adults Only**—AGE 41 (2–3) 2.28 [19.64]; TOTL 40 (230–435) 348.4 [8.17]; TAIL 40 (121–195) 171.4 [9.52]; FOOT 41 (41–52) 47.53 [4.36]; GLS 32 (44.03–47.17) 45.56 [1.77]; CIL 35 (37.72–41.9) 40.21 [2.52]; NL 35 (11.31–13.74) 12.89 [4.55]; ZB 30 (24.98–28.18) 26.76 [2.72]; IOB 37 (14.13–16.55) 15.2 [3.09]; BCW 36 (18.62–20.65) 19.77 [2.68]; CD 35 (19.98–21.96) 20.82 [1.91]; PTL 38 (18.03–21.24) 19.72 [3.4]; MTR 41 (6.86–8.05) 7.35 [3.49].

If subspecific designations were warranted within *S. aestuans*, *gilvigularis* Wagner, 1842, would probably apply to all of the preceding records. Handley (1976) treated *aestuans* and *gilvigularis* as specifically distinct, recording them both from southern Venezuela. Specimens from João Pessoa document that these squirrels range to the left bank of the Rio Juruá (see Emmons, 1990).

**FIELD NUMBERS**—487 ♂, 489 ♂, 493 ♂, 494 ♂, 513 ♂.

**DISTRIBUTIONAL RECORD**—Cametá (5).

**MEASUREMENTS**—AGE 5 (2–3) 2.7 [16.56]; TOTL 5 (330–390) 359 [7.12]; TAIL 5 (162–200) 181.4 [8.88]; FOOT 5 (45–50) 47.2 [5.48]; GLS 3 (43.13–45.6) 44.54; CIL 4 (38.23–40.9) 39.74; NL 5 (11.9–13.65) 12.81; ZB 3 (25.38–26.96) 26.33; IOB 3 (15.2–16.07) 15.68; BCW 4 (18.21–19.79) 19.30; CD 3 (19.79–20.35) 20.15; PTL 3 (18.89–20.36) 19.78; MTR 4 (6.86–7.36) 7.01.

Animals from Cametá agree with the description of *S. aestuans paraensis* Goeldi and Haggmann, 1904. However, the distinction of this race needs substantiation by a modern analysis of geographic variation.

## Family MURIDAE

### Subfamily SIGMODONTINAE

#### Tribe ORYZOMYINI

### *Oryzomys capito* (Olfers, 1818)

**FIELD NUMBERS**—2450 ♂ / 334 ♀.

**DISTRIBUTIONAL RECORDS**—João Pessoa, Patin-ga.

**MEASUREMENTS**—AGE 2 (2–3) 2.5; TOTL 2 (232–260) 246; TAIL 2 (116–120) 118; FOOT 2 (30–31) 30.5; GLS 2 (30.58–33.51) 32.04; CIL 2 (26.87–30.35) 28.61; NL 2 (11.68–13.6) 12.64; ZB 2 (15.48–17.32) 16.4; IOB 2 (4.89–5.4) 5.14; BCW 2 (13.39–13.86) 13.62; CD 2 (10.64–11)

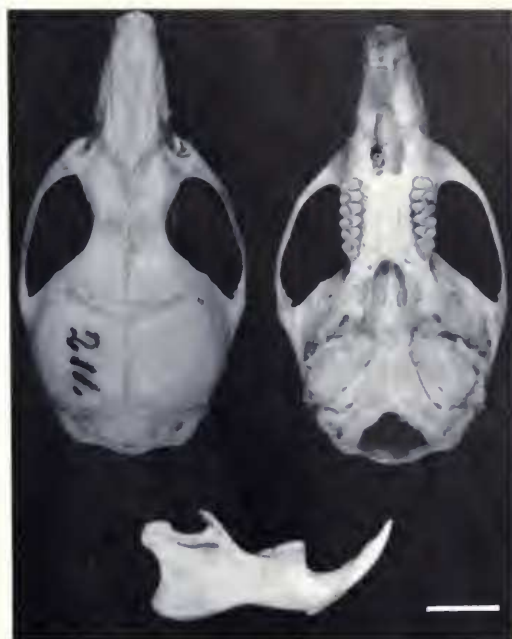


FIG. 6. Cranium and mandible of *Oryzomys keaysi* (AMO 211). White bar = 5 mm.

10.82; PTL 2 (13.75–15.33) 14.54; MTR 2 (4.52–5.31) 4.91.

AMO 334 was collected underneath a rotten log on the forest floor. The species is known to be a habitat generalist throughout much of the humid Neotropics (Handley, 1976; Fonseca and Kierulff, 1988; Stallings, 1988).

### *Oryzomys keaysi* Allen, 1900

**FIELD NUMBERS**—209 ♂, 211 ♂ / 205 ♀.

**DISTRIBUTIONAL RECORDS**—Cuesta Cucho (2), Locotal.

**MEASUREMENTS**—AGE 3 (1–2) 1.66; TOTL 3 (225–319) 274.66; TAIL 3 (120–173) 151; FOOT 3 (30–35) 33.33; GLS 2 (29.44–31.95) 30.69; CIL 28.3; NL 3 (11.09–14.74) 12.64; ZB 2 (15.54–16.6) 16.07; IOB 2 (5.17–5.82) 5.49; BCW 2 (13.75–14.8) 14.27; CD 11.88; PTL 3 (12.89–16.21) 14.31; MTR 3 (5.95–6.05) 6.01. **Adult Only**—AGE 2; TOTL 280; TAIL 160; FOOT 35; GLS 31.95; CIL 28.3; NL 12.11; ZB 16.6; IOB 5.17; BCW 14.8; CD 11.88; PTL 13.84; MTR 5.95.

Specimens of this species in the Field Museum collection are from Chaparé in Cochabamba, Bolivia. A skull is depicted in Figure 6.

### **Oryzomys nitidus** (Thomas, 1884)

FIELD NUMBERS—314 ♀ / 132 ♂.

DISTRIBUTIONAL RECORDS—Mojos, Reyes.

MEASUREMENTS—AGE 3; TOTL 2 (280–285) 282.5; TAIL 2 (130–140) 135; FOOT 2 (30–35) 32.5; GLS ♂; CIL ♂; NL 15.73; ZB 17.94; IOB 5.39; BCW 13.99; CD 12.52; PTL 15.57; MTR 4.82.

Field Museum specimens of *Oryzomys nitidus* are from lower elevations along the eastern versant of the Andes in Perú, from San Martín to Madre de Dios. Elsewhere, *O. nitidus* (or the related *intermedius*; P. Myers, pers. comm.) occurs at sea level in southeastern Brazil (Museu de Zoologia, São Paulo). No comprehensive review of this species has been undertaken to date.

### **Oligoryzomys microtis** (Allen, 1916)

FIELD NUMBERS—2299 ♂ / 2397 ♂ / 2336 ♂, 2337 ♂, 2338 ♂, 2347 ♀, 2348 ♀, 2352 ♂, 2353 ♂, 2358 ♂, 2361 ♀, 2377 ♂, 2378 ♂, 2379 ♂, 2387 ♂, 2128 ♂, 2129 ♂, 2359 ♂ / 1610 ♂, 1611 ♂, 1612 ♂, 1613 ♀ / 30 ♂.

DISTRIBUTIONAL RECORDS—Igarapé do Gordão, Igarapé Grande, João Pessoa (16), Lago Tapayuna (4), Victoria.

MEASUREMENTS—AGE 22 (1–3) 1.86; TOTL 23 (170–220) 193.87; TAIL 23 (88–120) 101.35; FOOT 23 (20–25) 22.13; GLS 10 (22.75–25.85) 24.57 [3.97]; CIL 14 (20.49–23.05) 22.1 [3.59]; NL 20 (7.76–11.06) 9.46 [7.18]; ZB 3 (13.04–13.35) 13.24; IOB 21 (3.53–4.09) 3.79 [4.06]; BCW 16 (10.43–11.2) 10.84 [1.94]; CD 13 (8.6–9.49) 9.1 [3.22]; PTL 21 (9.37–10.69) 10.12 [3.59]; MTR 22 (2.98–3.59) 4.89 [5.19]. **Adults Only**—AGE 13 (2–3) 2.6; TOTL 13 (184–212) 195.23 [4.19]; TAIL 13 (88–108) 100.92 [5.38]; FOOT 13 (21–23) 22 [3.21]; GLS 5 (23.94–25.85) 24.91 [2.79]; CIL 9 (21.34–23.05) 22.4 [2.36]; NL 13 (8.84–10.1) 9.57 [4.06]; ZB 2 (13.04–13.34) 13.19; IOB 13 (3.53–4.09) 3.81 [4.24]; BCW 10 (10.43–11.2) 10.83 [2.13]; CD 8 (8.72–9.49) 9.16 [2.88]; PTL 12 (9.59–10.69) 10.27 [2.73]; MTR 13 (3.05–3.59) 3.31 [5.05].

For nomenclature of this species and the two other *Oligoryzomys* that I recognize in this collection, I follow Carleton and Musser (1989), and strongly endorse their admonition that the genus is in need of revision. Specimens here average slightly larger than typical *O. microtis* (see Allen, 1916).

### **Oligoryzomys cf. fulvescens**

(Saussure, 1860)

FIELD NUMBERS—1017 ♂, 1018 ♀.

DISTRIBUTIONAL RECORD—Codajáz (2).

MEASUREMENTS—AGE 2 (2–2) 2; TOTL 2 (163–172) 167.5; TAIL 2 (78–89) 83.5; FOOT 2 (20–21) 20.5; GLS ♂; CIL ♂; NL 8.56; ZB ♂; IOB 2 (3.5–3.72) 3.61; BCW ♂; CD ♂; PTL 2 (9.16–9.21) 9.18; MTR 2 (2.99–3.19) 3.09.

According to Carleton and Musser (1989), pygmy rice rats of the *microtis* group occur in Brazil nowhere north of the Amazon, whereas the distribution of the *fulvescens* group does not extend south of the Rio Negro. The specimens from Codajáz fill this distributional hiatus in a generic range that is almost certainly continuous through the intervening lowland tropical forests.

### **Oligoryzomys destructor**

(Tschudi, 1844)

FIELD NUMBERS—210 ♀, 213 ♂ / 392 ♀ / 238 ♀, 256 ♂.

DISTRIBUTIONAL RECORDS—Cuesta Cucho (2), Illataco, Sorata (2).

MEASUREMENTS—AGE 5 (1–3) 1.4; TOTL 4 (202–210) 205.5; TAIL 4 (115–120) 117.5; FOOT 4 (25–32) 27; GLS 24.17; CIL 2 (21.06–21.8) 21.43; NL 2 (8.62–9.4) 9.01; ZB 12.9; IOB 4 (3.55–3.81) 3.64; BCW 2 (11.33–11.41) 11.37; CD 2 (9.12–9.58) 9.35; PTL 5 (9.82–10.32) 10.12; MTR 5 (3.58–3.75) 3.67.

### **Oecomys bicolor** (Tomes, 1860)

FIELD NUMBERS—2301 ♂ / 260 ♂, 261 ♀ / 2360 ♀.

DISTRIBUTIONAL RECORDS—Igarapé do Gordão, Iroçanga (2), João Pessoa.

MEASUREMENTS—AGE 4 (2–2) 2; TOTL 4 (207–230) 214.25; TAIL 4 (104–118) 109; FOOT 4 (22–23) 22.5; GLS 3 (26.6–27.66) 27.07; CIL 3 (23.52–24.5) 23.92; NL 3 (9.19–10.64) 9.7; ZB 2 (13.12–13.62) 13.37; IOB 4 (4.63–4.93) 4.77; BCW 3 (11.64–12.56) 12.24; CD 3 (10.06–10.34) 10.21; PTL 4 (10.99–11.95) 11.49; MTR 4 (3.61–4.27) 3.98.

Although *Oecomys* are strongly arboreal, AMO 260 and 261 were collected on the forest floor. A female (AMO 261) contained three embryos on 22 April 1934. A skull of this species is shown in Figure 7.





FIG. 7. Cranium and mandible of *Oecomys bicolor* (AMO 2360). White bar = 5 mm.



FIG. 8. Cranium and mandible of *Oecomys mamorae* (AMO 76). White bar = 5 mm.

### *Oecomys mamorae* (Thomas, 1906)

FIELD NUMBERS—153 ♂ / 62 ♂, 63 ♂, 64 ♀, 74 ♀, 75 ♂, 76 ♂, 77 ♂, 79 ♂, 80 ♀.

DISTRIBUTIONAL RECORDS—El Consuelo, Puerto Salinas (9).

MEASUREMENTS—AGE 10 (1–3) 2.1; TOTL 10 (210–305) 277.4 [10.42]; TAIL 10 (110–170) 147.3 [12.52]; FOOT 10 (25–30) 28.9 [6.41]; GLS 5 (29.47–35.62) 33.31 [6.98]; CIL 7 (27.98–32.05) 29.98 [4.74]; NL 10 (8.42–13.23) 11.27 [11.62]; ZB 2 (14.76–18.59) 16.67; IOB 8 (4.8–5.2) 4.99 [2.86]; BCW 6 (13.06–14.67) 14.12 [4.05]; CD 5 (11.05–12.06) 11.54 [3.75]; PTL 9 (11.75–15.74) 14.13 [8.76]; MTR 10 (4.83–5.44) 5.14 [3.88].

A skull of this species is depicted in Figure 8. The Field Museum has additional specimens from Cochabamba and Santa Cruz, Bolivia, and from Mato Grosso, Brazil.

### *Oecomys trinitatis tapajinus*

Thomas, 1909

FIELD NUMBERS—372 ♀ / 1003 ♀, 993 ♂ / 1147 ♀ / 1199 ♂ / 14 ♀ / 7390 ♀.

DISTRIBUTIONAL RECORDS—Aveiros, Codajáz (2), Igarapé do Castanha, Itaboca, Itapoama, Marai.

MEASUREMENTS—AGE 7 (1–3) 2 [28.86]; TOTL 6 (250–298) 277.66 [6.16]; TAIL 6 (140–160) 148.33 [5.07]; FOOT 6 (20–30) 25.16 [12.66]; GLS 6 (30.84–33.01) 31.99 [2.51]; CIL 6 (27.26–29.16) 28.52 [2.63]; NL 7 (10.52–13.16) 11.61 [8.53]; ZB 2 (17.08–17.11) 17.09; IOB 7 (5.19–5.87) 5.46 [4.18]; BCW 7 (12.53–14.14) 13.56 [3.83]; CD 6 (10.83–11.61) 11.37 [2.42]; PTL 7 (12.59–14.51) 13.95 [4.59]; MTR 7 (4.91–5.18) 5.03 [2.17]. **Adults Only**—AGE 6 (2–3) 2.16 [18.84]; TOTL 5 (270–298) 283.2 [4.12]; TAIL 5 (140–160) 150 [4.71]; FOOT 5 (20–30) 25.2 [14.14]; GLS 6 (30.84–33.01) 31.99 [2.51]; CIL 6 (27.26–29.16) 28.52 [2.63]; NL 6 (10.7–13.16) 11.79 [8.04]; ZB 2 (17.08–17.11) 17.09; IOB 6 (5.33–5.87) 5.51 [3.84]; BCW 6 (13.31–14.14) 13.73 [1.98]; CD 6 (10.83–11.61) 11.37 [2.42]; PTL 6 (13.79–14.51) 14.18 [1.7]; MTR 6 (4.91–15.18) 5.03 [2.35].

Specimens were collected inside a house, on the ground in forest, and on the ground in tall forest. AMO 372 contained three embryos on 10 June 1934. A skull of this species is shown in Figure 9. Other representatives of this species, documented by specimens at the Field Museum, occur in Colombia, Venezuela, and Suriname.



FIG. 9. Cranium and mandible of *Oecomys trinitatis tapajinus* (AMO 1147). White bar = 5 mm.

***Nectomys squamipes amazonicus***  
Hershkovitz, 1944

FIELD NUMBERS—321 ♂, 322 ♀ / 2302 ♂ / 8 ♀, 26 ♀ / 2151 ♂ / 7395 ♀, 7398 ♂ / 7448 ♂.

DISTRIBUTIONAL RECORDS—Chulumani (2), Igarapé do Gordão, Itapoama (2), João Pessoa, Marai (2), Prainha.

MEASUREMENTS—AGE 8 (2–3) 2.5 [21.38]; TOTL 8 (326–430) 379.37 [9.57]; TAIL 8 (140–220) 181.25 [16.6]; FOOT 8 (43–50) 47.75 [6.1]; GLS 4 (39.44–45.36) 42.42; CIL 4 (35.74–42.52) 38.86; NL 6 (16.58–19.53) 17.88 [6.48]; ZB 6 (20–24.47) 22.2 [7.84]; IOB 6 (6.11–7.53) 6.81 [7.42]; BCW 6 (16.18–17.77) 16.83 [3.79]; CD 4 (14.1–16.67) 15.3; PTL 7 (17.76–22.15) 19.38 [8.64]; MTR 7 (6.65–8) 7.19 [6.17].

AMO 8 was taken over water in a trap and contained four embryos on 24 March 1934; three other animals were taken on the ground near water.

Until karyotypic variation within *Nectomys* is geographically delimited and its correlations with morphological variation are better understood, only a single polytypic species of *Nectomys* can be recognized. Gardner and Patton (1976) and Maia et al. (1984) described no fewer than eight karyotypic rearrangements in animals allocated to this species. Specimens from Marai and Prainha are near topotypes of *amazonicus*, appearing only

slightly smaller and more brightly colored along the sides than typical representatives of that taxon. Specimens from the western Amazon Basin, which Hershkovitz (1944) provisionally assigned to *melanius*, differ only slightly from more eastern specimens. According to the range map given by Hershkovitz (1944), the Chulumani specimens fall within the range of *garleppi*; however, these are only slightly paler and not apparently bigger than *amazonicus* and do not approach the size, pallor, or monochrome of true *garleppi* from Cuzco, Perú.

***Rhipidomys mastacalis cearanus***  
Thomas, 1910

FIELD NUMBERS—371 ♂, 385 ♀, 7479 ♀ / 7393 ♀, 7403 ♀ / 9967 ♀, 9970 ♀.

DISTRIBUTIONAL RECORDS—Aveiros (3), Marai (2), Rio Tapajós (2).

MEASUREMENTS—AGE 4 (2–2) 2; TOTL 6 (240–290) 269.16 [8.17]; TAIL 6 (120–160) 145 [9.5]; FOOT 6 (24–30) 26.5 [10.33]; GLS 2 (32.94–33.03) 32.98; CIL 3 (29.31–29.35) 29.33; NL 3 (11.04–11.14) 11.09; ZB 17.47; IOB 4 (5.35–5.81) 5.51; BCW 4 (13.63–14.25) 13.88; CD 3 (12.08–12.32) 12.18; PTL 4 (12.98–14.4) 13.41; MTR 4 (4.94–5.09) 4.99.

Those from Aveiros were caught in traps placed on the ground in forest during March and June of 1934. According to Davis (1947), this semi-arboreal rat is taken in the trees during the summer and primarily on the ground in winter. Across its range, *R. mastacalis* occurs only or principally in undisturbed primary forest (Rio de Janeiro—Davis, 1947; Minas Gerais—Stallings, 1988).

Tribe AKODONTINI

***Akodon subfuscus* Osgood, 1944**

FIELD NUMBERS—239 ♂, 245 ♀, 246 ♀ / 212 ♀ / 217 ♂, 218 ♀, 219 ♀, 220 ♀, 221 ♂, 222 ♂, 223 ♂, 224 ♀, 225 ♀, 228 ♀, 229 ♀, 230 ♂ / 394 ♂ / 235 ♂, 240 ♂, 241 ♀, 243 ♀, 244 ♂, 247 ♂, 248 ♂, 249 ♂, 250 ♂, 251 ♂, 252 ♀, 253 ♀, 254 ♀, 255 ♀.

DISTRIBUTIONAL RECORDS—Chilcani (3), Cuesta Cucho, Huancuni (12), Illataco, Sorata (14).

MEASUREMENTS—AGE 30 (1–6) 2.7 [51.6]; TOTL 30 (130–180) 153.23 [7.43]; TAIL 30 (55–75) 63.56 [7.39]; FOOT 30 (20–22) 20.23 [2.8]; GLS 13 (23.15–26.49) 24.82 [4.05]; CIL 12 (20.57–24.14) 22.22 [5.02]; NL 23 (7.77–10.18) 8.64 [6.19];

ZB 10 (11.61–13.34) 12.34 [3.87]; IOB 22 (4.25–5.09) 4.52 [4.54]; BCW 16 (10.72–12.96) 11.47 [4.41]; CD 13 (8.96–9.67) 9.3 [2.23]; PTL 23 (9.42–11.43) 10.3 [4.31]; MTR 29 (3.7–5.09) 3.99 [5.94]. **Adults Only**—AGE 5 (4–6) 5.20; TOTL 6 (148–185) 169.17 [7.96]; TAIL 5 (60–85) 69.67 [12.16]; FOOT 6 (20–20) 20 [0]; GLS 4 (24.2–26.19) 25.32; CIL 4 (21.75–24.14) 23.22; NL 5 (8.48–10.18) 9.1; ZB 4 (12.22–13.34) 12.7; IOB 4 (4.38–4.75) 4.58; BCW 4 (11.45–11.74) 11.57; CD 3 (9.17–9.53) 9.39; PTL 4 (10.15–11.43) 10.91; MTR 5 (3.91–4.25) 4.05.

Although previously confused with *Akodon boliviensis*, *A. subfuscus* is a distinctive species of *Akodon*, with darker coloration and narrower zygomatic plates than the genotype (Myers et al., 1990). According to Myers et al., specimens from La Paz represent the nominate subspecies, being replaced in Arequipa and eastern Cuzco by the newly named subspecies *arequipae*.

#### **Akodon puer** Thomas, 1902

FIELD NUMBERS—359 ♀ / 367 ♀, 374 ♀ / 391 ♀.

DISTRIBUTIONAL RECORDS—Liriuni, Toncoma (2), Ucho Ucho.

MEASUREMENTS—AGE 4 (2–5) 4.25; TOTL 4 (150–175) 161.25; TAIL 4 (55–70) 63.75; FOOT 4 (20–20) 20; GLS  $\phi$ ; CIL  $\phi$ ; NL 2 (9.19–9.48) 9.33; ZB 10.38; IOB 4 (3.56–4.38) 4.07; BCW 9.08; CD  $\phi$ ; PTL 3 (9.14–10.63) 10.08; MTR 4 (3.31–3.9) 3.73.

From *subfuscus*, *puer* can be readily distinguished by its paler coloration (brown without blackish wash in mid-dorsum) and shorter feet; the latter are covered by whitish, not buffy, hairs. *Akodon puer* characteristically inhabits puna grasslands at higher elevations (Myers et al., 1990).

#### **Akodon dayi** Osgood, 1916

FIELD NUMBERS—325 ♀, 328 ♂ / 148 ♂, 152 ♀ / 45 ♂, 51 ♂.

DISTRIBUTIONAL RECORDS—Chulumani (2), El Consuelo (2), Victoria (2).

MEASUREMENTS—AGE 6 (3–4) 3.33; TOTL 5 (185–205) 191 [4.68]; TAIL 5 (65–85) 74 [12.6]; FOOT 5 (25–28) 25.6 [5.24]; GLS 2 (27.16–29.62) 28.39; CIL 2 (25.49–27.97) 26.73; NL 5 (10.24–11.5) 10.88 [4.72]; ZB 14.41; IOB 4 (5.15–5.35) 5.25; BCW 2 (12.37–13.23) 12.8; CD 2 (10.59–10.74) 10.66; PTL 5 (11.04–13.51) 12.24 [8.04];

MTR 5 (4.42–5.31) 4.87 [6.61]. **Adults Only**—AGE 2 (4–4) 4; TOTL 2 (185–205) 195; TAIL 2 (82–85) 83.5; FOOT 2 (25–25) 25; GLS  $\phi$ ; CIL  $\phi$ ; NL 2 (10.24–11.5) 10.87; ZB  $\phi$ ; IOB 5.35; BCW  $\phi$ ; CD  $\phi$ ; PTL 11.04; MTR 4.42.

*Akodon dayi* is distinguished from other dark, medium-sized *Akodon* (e.g., *aerosus*) by its larger foot (averaging 25 versus 23 mm), deeper rostrum, and more vertical zygomatic plate. Compared with *A. aerosus baliolus* from Perú, the teeth are larger, the supraorbital margins sharper, and the zygomatic plate broader and more vertical. In addition, the palatine foramina of *dayi* are broader and more bowed, and the palate is generally wider.

#### **Oxymycterus** sp. nov. A

FIELD NUMBER—7379 ♂.

DISTRIBUTIONAL RECORD—Marai.

MEASUREMENTS—AGE 2; TOTL 171; TAIL 32 (incomplete); FOOT 48; GLS 34.75; CIL 31.74; NL 13.45; ZB  $\phi$ ; IOB 6.19; BCW  $\phi$ ; CD 11.48; PTL 13.08; MTR 5.82.

This specimen represents an unnamed lowland species represented by dozens of specimens at the Field Museum, Museu Goeldi, and Smithsonian Institution. Known localities center on the lower Rio Tapajós near its confluence with the Amazon. The description of this species and its placement within the oxymycterine rodents are currently being investigated by the author.

#### **Oxymycterus** sp. nov. B

FIELD NUMBER—204 ♀.

DISTRIBUTIONAL RECORD—Locotal.

MEASUREMENTS—AGE 1; TOTL 255; TAIL 119; FOOT 30; GLS  $\phi$ ; CIL  $\phi$ ; NL  $\phi$ ; ZB  $\phi$ ; IOB 6.43; BCW  $\phi$ ; CD  $\phi$ ; PTL 11.9; MTR 4.65.

This specimen represents an unnamed highland species that is apparently allied to *Oxymycterus akodontius* of Argentina. Field Museum has another, better preserved specimen of this form, also from Cochabamba, Bolivia.

#### **Oxymycterus paramensis paramensis** Thomas, 1902

FIELD NUMBERS—358 ♀ / 372 ♀, 373 ♂, 375 ♂ / 387 ♂, 388 ♀, 390 ♀.



FIG. 10. Cranium and mandible of *Oxymycterus paramensis* (AMO 372). White bar = 5 mm.

DISTRIBUTIONAL RECORDS—Liriuni, Toncoma (3), Ucho Ucho (3).

MEASUREMENTS—AGE 6 (2–3) 2.33; TOTL 6 (185–240) 228.33 [9.66]; TAIL 6 (56–100) 86.83 [18.36]; FOOT 6 (25–30) 29.16 [6.99]; GLS 35.1; CIL 30.73; NL 6 (12.86–14.42) 13.63 [3.83]; ZB 2 (15.12–15.12) 15.12; IOB 5 (5.8–6.05) 5.96 [1.6]; BCW 4 (13.56–14.25) 13.85; CD 11.22; PTL 6 (12.86–13.85) 13.45 [2.72]; MTR 5 (4.95–5.11) 5.03 [1.23].

Specimens from Cochabamba agree closely with Thomas's description; a skull is shown in Figure 10. Externally, these specimens are perhaps slightly more uniform in general coloration than is typical, but not so extreme as in *nigrifrons*. All show a tendency toward development of the black stripe on the dorsum of the rhinarium that led Osgood (1944) to recognize the latter as a distinct geographic race.

## Tribe PHYLOTINI

### *Calomys callosus* (Rengger, 1830)

FIELD NUMBERS—146 ♀, 147 ♀, 149 ♂, 150 ♂, 154 ♂, 156 ♀, 166 ♀, 171 ♀.

DISTRIBUTIONAL RECORD—El Consuelo (8).

MEASUREMENTS—AGE 8 (1–3) 2.25 [31.42]; TOTL 8 (160–200) 181.25 [8.04]; TAIL 8 (70–85) 75.87 [7.09]; FOOT 7 (20–25) 22.42 [6.74]; GLS 3 (26.17–26.88) 26.47; CIL 5 (23.56–24.37) 24.11 [1.39]; NL 8 (9.68–10.98) 10.35 [4.4]; ZB 2 (13.93–14.2) 14.06; IOB 7 (4.07–4.38) 4.22 [2.79]; BCW 6 (11.14–12.65) 11.84 [4.51]; CD 5 (8.8–10.2) 9.5 [5.22]; PTL 6 (11.53–12.94) 11.98 [4.37]; MTR 8 (3.97–4.39) 4.21 [3.6]. **Adults Only**—AGE 7 (2–3) 2.42; TOTL 7 (160–200) 184.28 [6.9]; TAIL 7 (70–85) 76.42 [7.27]; FOOT 6 (20–25) 22.33 [7.31]; GLS 3 (26.17–26.88) 26.47; CIL 5 (23.56–24.37) 24.11 [1.39]; NL 7 (9.96–10.98) 10.45 [3.78]; ZB 2 (13.93–14.2) 14.06; IOB 6 (4.07–4.38) 4.22 [3.04]; BCW 5 (11.49–12.65) 11.99 [3.79]; CD 4 (9.46–10.2) 9.67; PTL 6 (11.53–12.94) 11.98 [4.37]; MTR 7 (3.97–4.39) 4.21 [3.87].

### *Calomys venustus* (Thomas, 1894)

FIELD NUMBERS—323 ♀, 326 ♂, 327 ♂, 329 ♂, 331 ♂, 332 ♀, 333 ♀, 334 ♀, 335 ♂, 336 ♂, 337 ♂, 338 ♂, 339 ♂, 340 ♂, 341 ♂, 342 ♂, 343 ♂, 344 ♀, 345 ♀, 346 ♀, 347 ♀, 348 ♀ / 350 ♀.

DISTRIBUTIONAL RECORDS—Chulumani (22), Laza.

MEASUREMENTS—AGE 23 (2–3) 2.6 [19.12]; TOTL 23 (145–211) 188.91 [10]; TAIL 23 (52–100) 85.43 [13.31]; FOOT 23 (20–25) 23.39 [8.22]; GLS 10 (25.79–28.43) 27.27 [3.36]; CIL 11 (23.44–25.88) 24.81 [3.47]; NL 22 (10.01–12.23) 11.16 [5.71]; ZB 3 (14.53–15.03) 14.79; IOB 19 (4.02–4.56) 4.27 [3.55]; BCW 12 (11.72–12.53) 12.05 [2.27]; CD 9 (9.42–10.13) 9.82 [2.84]; PTL 22 (10.84–12.69) 11.97 [3.88]; MTR 23 (4.19–4.91) 4.49 [3.62].

Although Hershkovitz (1962) treated *venustus* as a junior synonym of *callosus*, Olds (pers. comm.) distinguishes the two as distinct species. A skull of this form is shown in Figure 11.

### *Phyllotis cf. xanthopygus* (Waterhouse, 1837)

FIELD NUMBERS—233 ♂ / 368 ♂ / 383 ♂, 386 ♂.

DISTRIBUTIONAL RECORDS—Huancuni, Toncoma, Ucho Ucho (2).

MEASUREMENTS—AGE 4 (2–3) 2.25; TOTL 4 (240–270) 258.5; TAIL 4 (117–150) 134.25; FOOT 4 (25–29) 26.75; GLS 32.21; CIL 29.64; NL 4 (12.22–13.85) 12.86; ZB 16.72; IOB 4 (4.05–4.21)



FIG. 11. Cranium and mandible of *Calomys venustus* (AMO 334). White bar = 5 mm.



FIG. 12. Cranium and mandible of *Phyllotis* cf. *xanthopygus* (AMO 233). White bar = 5 mm.

4.14; BCW 3 (13.34–14.01) 13.63; CD 11.65; PTL 4 (12.45–14.81) 13.59; MTR 4 (5.16–5.42) 5.32.

The largest long-tailed *Phyllotis* known from Cochabamba is *P. wolffsohni*, whose distinctive supraorbital characters eliminate confusion with other species. Another species from adjacent Argentina, *P. caprinus*, has a broader IOB with more rounded edges. At three localities, Olalla collected a different large *Phyllotis*, assigned here to the widespread Andean species *P. xanthopygus* (see Walker et al., 1984, for the restriction of *darwini* to the vicinity of Coquimbo, Chile). Pearson (1958) referred Field Museum specimens of this species from Cochabamba to *P. darwini rupestris*, but this form has smaller tooththrows and a shorter tail that is more strongly bicolored and more heavily haired (especially at the tip) than Olalla's specimens. A skull of Olalla's *Phyllotis* is shown in Figure 12.

#### *Phyllotis osilae* J. A. Allen, 1901

FIELD NUMBERS—226 ♂, 227 ♀, 231 ♂, 232 ♀.

DISTRIBUTIONAL RECORD—Huancuni (4).

MEASUREMENTS—AGE 4 (1–3) 2; TOTL 4 (185–235) 206; TAIL 4 (95–120) 105.5; FOOT 4 (24–27) 25.5; GLS 26.04; CIL 22.49; NL 2 (10.7–11.07)

10.88; ZB 2 (13.65–13.87) 13.76; IOB 2 (4.03–4.06) 4.04; BCW 2 (13.09–13.14) 13.11; CD 10.43; PTL 3 (11.22–12.21) 11.69; MTR 4 (4.84–5.22) 5.02. **Adults Only**—AGE 3 (2–3) 2.33; TOTL 3 (201–235) 213; TAIL 3 (102–120) 109; FOOT 3 (25–27) 26; GLS ♂; CIL ♂; NL 11.07; ZB 13.87; IOB 4.03; BCW 13.09; CD ♂; PTL 2 (11.65–12.21) 11.93; MTR 3 (4.84–5.08) 4.96.

AMO 227 contained four embryos when taken on 17 July 1938. The Huancuni material appears to represent the nominate race.

#### *Phyllotis wolffsohni* Thomas, 1902

FIELD NUMBERS—356 ♀ / 362 ♂, 363 ♀, 364 ♂, 365 ♀, 366 ♀ / 385 ♀, 389 ♀.

DISTRIBUTIONAL RECORDS—Liriuni, Toncoma (5), Ucho Ucho (2).

MEASUREMENTS—AGE 7 (2–3) 2.28; TOTL 8 (205–290) 253.12 [10.81]; TAIL 8 (80–150) 124.37 [20.88]; FOOT 8 (25–30) 29 [6.64]; GLS 4 (29.62–33.14) 31.39; CIL 5 (27.13–30.7) 29.26 [5.53]; NL 6 (12.31–14.1) 13.22 [6.09]; ZB 2 (16.95–17.79) 17.37; IOB 7 (4.55–5.05) 4.74 [3.62]; BCW 6 (13.65–14.55) 14.15 [2.05]; CD 4 (11.1–11.94) 11.61; PTL 7 (13.56–15.67) 14.51 [6.18]; MTR 7 (5.77–6.14) 5.96 [2.17].



FIG. 13. Cranium and mandible of *Phyllotis wolffsohni* (AMO 362). White bar = 5 mm.

The sharp and diverging supraorbital ridges and heavy rostrum of this species (fig. 13), as well as its longer tail, readily distinguish it from other Bolivian *Phyllotis*. In these characters, *P. wolffsohni* bears substantial resemblance to sympatric *Graomys domorum*. From *G. domorum*, *P. wolffsohni* differs in having throat hairs that are gray (rather than white) at the base and supraorbital ridges that converge behind the eyes (rather than throughout the interorbital region).

Most previous specimens of *P. wolffsohni*, including the type, come from Cochabamba, Bolivia, between 2200 and 3400 m (Pearson, 1958). The Ucho Ucho specimens extend the known upper elevational limit of this species to over 3500 m.

### *Holochilus sciureus amazonicus* Osgood, 1915

FIELD NUMBERS—2300 ♀, 2311 ♀ / 2408 ♂ / 2350 ♀, 2357 ♀, 2376 ♀, 2388 ♀, 2462 ♀, 2476 ♀ / 2489 ♀, 2490 ♂, 2491 ♂.

DISTRIBUTIONAL RECORDS—Igarapé do Gordão (2), Igarapé Grande, João Pessoa (6), Santo Antônio (3).

MEASUREMENTS—AGE 10 (1–3) 2.1 [41.69]; TOTL 10 (195–380) 311.3 [18.62]; TAIL 10 (92–

168) 141.6 [18.47]; FOOT 10 (30–50) 39.8 [13.17]; GLS 5 (35.84–40.07) 38.01 [4.8]; CIL 5 (33.05–37.25) 35.36 [5.42]; NL 7 (14.15–16.42) 15.46 [5.14]; ZB 4 (20.01–22.12) 21.14; IOB 8 (4.26–5.04) 4.59 [5.29]; BCW 7 (14.3–16.4) 15.21 [4.48]; CD 6 (12.95–15.61) 14.03 [6.82]; PTL 10 (16.22–21.55) 18.93 [8.14]; MTR 12 (7.09–8.2) 7.53 [4.22].  
Adults Only—AGE 7 (2–3) 2.57; TOTL 7 (307–380) 342.85 [6.43]; TAIL 7 (126–168) 154.71 [9.28]; FOOT 7 (39–50) 42 [9.42]; GLS 4 (36.43–40.07) 38.55; CIL 4 (33.74–37.25) 35.93; NL 6 (14.71–16.42) 15.68 [4.64]; ZB 4 (20.01–22.12) 21.14; IOB 6 (4.26–5.04) 4.58 [6.14]; BCW 6 (14.3–16.4) 15.27 [4.74]; CD 5 (13.29–15.61) 14.25 [6.24]; PTL 7 (17.75–21.55) 19.43 [6.27]; MTR 7 (7.09–8.2) 7.59 [4.25].

This name combination follows Massoia (1980), but the karyotypic diversity of *Holochilus* is now poorly reflected in its taxonomy (Nachman and Myers, 1989). Cabrera (1961) gave the range of *amazonicus* as extending from Amazonian Perú to the Rio Tapajós; east of this area, the nominate subspecies (with type locality restricted to Lagoa Santa in Minas Gerais) is found. Specimens here were collected from both banks of the Rio Juruá and average slightly smaller, especially in tail length, than typical specimens from Itacoatiara (Osgood, 1915). Reig (in Honacki et al., 1982) considered *amazonicus* a species distinct from both *brasiliensis* and *sciureus*.

### Subfamily MURINAE

#### *Mus musculus* Linnaeus, 1758

FIELD NUMBERS—395 ♂, 396 ♀ / 236 ♀, 237 ♂, 242 ♀ / 434 “?”, 435 ♂, 436 ♀, 437 ♀.

DISTRIBUTIONAL RECORDS—Illataco (2), Sorata (3), Santarém (4).

MEASUREMENTS—AGE 9 (2–3) 2.22 [19.84]; TOTL 7 (144–170) 161.42 [5.25]; TAIL 7 (75–91) 81 [6.76]; FOOT 7 (15–20) 18.71 [9.61]; GLS 2 (21.19–21.25) 21.22; CIL 2 (19.79–19.95) 19.87; NL 9 (6.72–8.74) 7.64 [8.04]; ZB 3 (10.76–11.64) 11.07; IOB 7 (3.42–3.74) 3.6 [2.84]; BCW 3 (9.25–10) 9.53; CD 3 (7.38–7.69) 7.54; PTL 7 (8.74–10.38) 9.51 [6.22]; MTR 8 (3.26–3.67) 3.44 [4.36].

#### *Rattus rattus* (Linnaeus, 1758)

FIELD NUMBERS—514 ♂ / 2298 ♀ / 2121 ♂, 2122 ♀, 2125 ♀, 2132 ♂ / 1466 ♂.



FIG. 14. Cranium and mandible of *Mesomys hispidus* (AMO 147). White bar = 5 mm.

**DISTRIBUTIONAL RECORDS**—Cameté, Igarapé do Gordão, João Pessoa (4), Lago do Canaçary.

**MEASUREMENTS**—AGE 6 (1–3) 2.16; TOTL 7 (290–390) 340.71 [9.75]; TAIL 7 (180–210) 197.42 [5.18]; FOOT 7 (33–35) 34.57 [2.27]; GLS 5 (33.33–43.39) 38.63 [10.35]; CIL 5 (33.12–40.61) 36.21 [8.4]; NL 5 (11.01–15.21) 13.43 [13.51]; ZB  $\phi$ ; IOB 6 (5.2–6.03) 5.58 [5.82]; BCW 5 (14.89–17.24) 16.26 [6.05]; CD 4 (13.71–15.04) 14.38; PTL 5 (15.01–20.36) 17.6 [11.77]; MTR 6 (6.31–7.08) 6.69 [4.33]. **Adults Only**—AGE 5 (2–3) 2.40; TOTL 5 (320–390) 349 [8.61]; TAIL 5 (180–210) 197.4 [6.28]; FOOT 5 (33–35) 34.4 [2.6]; GLS 4 (36.22–43.39) 39.96; CIL 5 (33.12–40.61) 36.21 [8.4]; NL 4 (12.37–15.21) 14.03; ZB  $\phi$ ; IOB 5 (5.27–6.03) 5.65 [5.27]; BCW 4 (15.74–17.24) 16.6; CD 4 (13.71–15.04) 14.38; PTL 4 (16.33–20.36) 18.24; MTR 5 (6.52–7.08) 6.76 [3.67].

## Family ECHIMYIDAE

### *Mesomys hispidus* (Desmarest, 1817)

**FIELD NUMBER**—147 ♀.

**DISTRIBUTIONAL RECORD**—Iroçanga

**MEASUREMENTS**—AGE 9; TOTL 190; TAIL  $\phi$ ; FOOT 28; GLS 39.9; CIL 35.55; NL 11.42; ZB 21.11; IOB 10.33; BCW 17.09; CD 14.74; PTL 13.49; MTR 5.81; ROSL 12.72; PLB 4.13.

The genus *Mesomys* is in need of revision. Ac-

cording to Cabrera (1961), two subspecies occur along the lower Amazon: *hispidus*, with type locality restricted to Borba on the Rio Madeira by Tate (1939), and *stimulax*, with type locality at Cameté on the Rio Tocantins. Despite the proximity of the Iroçanga locality to the latter, AMO 147 differs from the type of *stimulax* in its smaller teeth, unflared nasals, and smaller interorbital breadth (cf. fig. 14 and Thomas, 1911).

### *Lonchothrix emiliae* Thomas, 1920

**FIELD NUMBERS**—53 ♀, 99 ♀, 115 ♂, 185 ♀.

**DISTRIBUTIONAL RECORD**—Iroçanga (4).

**MEASUREMENTS**—AGE 4 (9–9) 9; TOTL 4 (390–430) 410.25; TAIL 4 (169–202) 187.75; FOOT 4 (35–55) 40.5; GLS 3 (43.8–48) 46.4; CIL 4 (37.2–43.4) 41.07; NL 3 (13.6–14.2) 13.8; ZB 4 (24.1–26) 25.12; IOB 4 (10.5–12) 11.12; BCW 3 (18.6–19.2) 18.92; CD 4 (16.7–17.4) 17.08; PTL 4 (15–16.8) 16.2; MTR 4 (7.5–7.8) 7.6; ROSL 3 (14.2–15.8) 14.87; PLB 3 (5.2–5.8) 5.4.

AMO specimens in the Stockholm collection were captured at the edge of a beach, in a hole in a dead tree (115), from a hole in a tree in second growth (185), from a hole in a tree in virgin forest (99), and from a hole in a living tree in virgin forest (53). The last named specimen contained three embryos on 13 April 1934.

This poorly known arboreal echimyid is known



FIG. 15. Cranium and mandible of *Lonchothrix emiliae* (AMO 53). White bar = 5 mm.

only from the Rio Tapajós drainage. The type locality of *emiliae* is at Villa Braga, a short distance upstream from the Iroçanga locality on the west bank of the Tapajós. Emmons (1990) showed a geographical distribution that includes both sides of that river. Specimens in the American Museum document its occurrence at Aramanay, Tauary, and Caxiricatuba. Skulls of this species (fig. 15) bear a substantial resemblance to those of *Mesomys*.

### *Isothrix bistriata bistriata* Wagner, 1845

FIELD NUMBERS—2118 ♂, 2138 ♀, 2140 ♀, 2161 ♂, 2183 ♂, 2217 ♀, 2235 ♂, 2475 ♂ / 1261 ♂ / 2488 ♂.

DISTRIBUTIONAL RECORDS—João Pessoa (8), Labrea, Lago Grande.

MEASUREMENTS—**João Pessoa**—AGE 8 (6–9) 7.62 [12.01]; TOTL 8 (260–502) 433.37 [19.88]; TAIL 7 (126–245) 213 [20.52]; FOOT 8 (43–51) 48.37 [5.94]; GLS 7 (55.4–59) 57.41 [2.15]; CIL 8 (41.9–52.3) 49.9 [6.68]; NL 7 (16.6–19.2) 17.44 [5.07]; ZB 8 (24.6–30.6) 28.62 [6.68]; IOB 8 (11.6–15.1)



FIG. 16. Dorsal views of skins of *Isothrix bistriata* (left, AMO 1910) and *I. pagurus* (right, AMO 187).

13.41 [8.13]; BCW 8 (19.5–22.7) 21.5 [4.55]; CD 8 (18.2–20.7) 19.87 [4.14]; PTL 8 (17–21.5) 20.3 [7.01]; MTR 8 (10.2–11.7) 11.16 [4.3]; ROSL 8 (18.2–19.8) 19.13 [3.09]; PLB 7 (7.4–8.6) 8.05 [6.05]. **Labrea**—AGE 6; TOTL 440; TAIL 220; FOOT 50; GLS ♂; CIL 44.8; ZB 26.6; IOB 13.6; BCW 21.6; PTL 16.7; MTR 10.4; CD 19.1; ROSL ♂; PLB 6. **Lago Grande**—AGE 8; TOTL 420; TAIL 170; FOOT 45; GLS 56.5; CIL 50.2; NL 16.5; ZB 29.1; IOB 14.1; BCW 21.5; CD 20.2; PTL 20; MTR 11.1; ROSL 18.4; PLB 7.7.

Patton and Emmons (1985) reviewed geographic variation in *Isothrix*. They concluded that *bistriata* and *villosa*, considered as different species by Cabrera (1961), belonged to a single biological species, *I. bistriata*. However, Patton and Emmons concluded that *pagurus*, treated by Cabrera (1961) as a race of *I. bistriata*, was distinct enough to warrant recognition as a separate species. Specimens in the Stockholm collection generally support the morphological and biogeographic inferences of Patton and Emmons based on material at the American Museum of Natural History and at the Museum of Vertebrate Zoology. Records here represent both banks of the Rio Juruá and the right (east) bank of the Rio Purus. The last locality lies approximately midway between the Beni, Bolivia, and Loreto, Perú, samples of Patton and Emmons (1985; see also Ihering, 1904).

### *Isothrix pagurus* Wagner, 1845

FIELD NUMBERS—613 ♀ / 148 ♂, 187 ♀, 297 ♂.



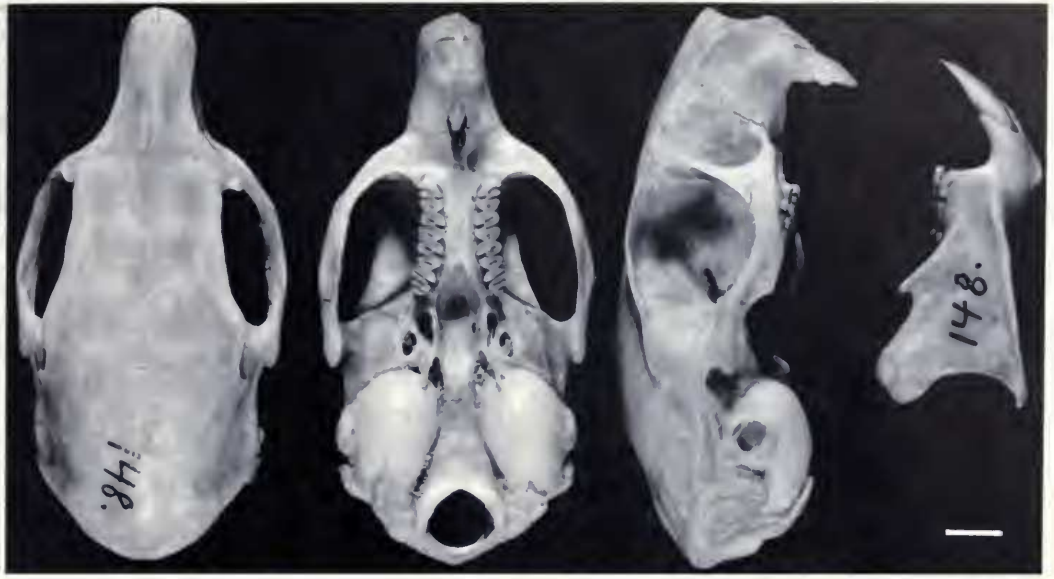


FIG. 17. Cranium and mandible of *Isothrix pagurus* (AMO 148). White bar = 5 mm.

DISTRIBUTIONAL RECORDS—Casa Nova, Iroçanga (3).

MEASUREMENTS—Casa Nova—AGE 6; TOTL 429; TAIL 219; FOOT 42; GLS 49.4; CIL 42.7; NL 14.6; ZB 24.4; IOB 11; BCW 19.5; CD 17.1; PTL 17.1; MTR 9.9; ROSL 16.3; PLB 6.4. Iroçanga—AGE 3 (2–6) 4.33; TOTL 3 (364–445) 409.33; TAIL 3 (184–230) 208; FOOT 3 (40–46) 42; GLS 2 (47.9–49.7) 48.8; CIL 3 (37.1–42.6) 40.73; NL 3 (11.8–15) 13.8; ZB 3 (20.4–24.5) 22.93; IOB 3 (9.4–12.6) 11.23; BCW 3 (18.8–19.8) 19.13; CD 3 (16.5–18.6) 17.33; PTL 3 (13.7–17.5) 16.16; MTR 2 (9.7–10.5) 10.1; ROSL 2 (16.2–16.3) 16.25; PLB 3 (4.6–7.4) 6.3.

All four specimens were taken in virgin forest, from tree holes in both living and dead trees.

This species of *Isothrix* can be readily distinguished from the more widespread *I. bistrriata* by its chestnut-colored crown, lack of facial stripes, and less bushy, monochrome tail (fig. 16). A skull is shown in Figure 17. Patton and Emmons (1985) stated that the range of *I. pagurus* extends “from Rio Madeira east to the Rio Tapajós and north to the lower Rio Negro.” They cited four localities (Igarapé Brabo [= Bravo], Igarapé Amarin, Limonal, and Inajatuba), all on the Rio Tapajós, the first three at least being on the west (left) bank. These specimens from Iroçanga document the occurrence of *I. pagurus* on the east (right) bank of the lower Rio Tapajós.

#### *Echimys armatus* (I. Geoffroy, 1838)

COMMENT—Like several other echimyid genera, *Echimys* is in need of revision. While certain Amazonian *Echimys* (particularly *grandis* and *chrysurus*) are clearly delimited from other taxa, others have unknown limits, including members of the putative genus *Makalata* Husson. Emmons (1990) treated *Makalata* as a synonym of *Echimys armatus*, and her lead is followed here. However, distinctive morphs (fig. 18) and their distributions are discussed here in the hopes that this information may contribute to a more comprehensive revision of the group.

FIELD NUMBERS—209 ♀, 45 ♀, 46 ♂ / 1433 ♀ / 1453 ♂.

DISTRIBUTIONAL RECORDS—Iroçanga (3), Itacoatiara, Lago do Canaçary.

MEASUREMENTS—Iroçanga—AGE 3 (2–6) 4; TOTL 3 (340–462) 410.66; TAIL 3 (162–211) 193.66; FOOT 3 (36–41) 39; GLS 3 (43.6–53.7) 50.26; CIL 3 (37.8–47.8) 44.16; NL 3 (13.3–17.2) 15.53; ZB 3 (20.6–26.1) 23.93; IOB 3 (9.2–12.5) 11.13; BCW 3 (18.1–21.6) 20.1; CD 3 (16.8–19) 18.2; PTL 3 (17.2–21.7) 20.2; MTR 2 (11.6–12.4) 12; ROSL 3 (14.7–19.3) 17.66; PLB 3 (7.4–10.4) 9.13. Itacoatiara—AGE 5; TOTL 235; TAIL 10 [amputated]; FOOT 43; GLS 53.9; CIL 48.3; NL 17.1; ZB 26.7; IOB 13.6; BCW 21.6; CD 18.7; PTL 21.7; MTR 12.1; ROSL 19.8; PLB 9.3. Lago



FIG. 18. Contrasts in dorsal pelage of two morphs identified as *Echimys armatus* following Emmons (1990). See text for discussion.

**do Canaçary**—AGE 4; TOTL 375; TAIL 195; FOOT 40; GLS 50.9; CIL 44.8; NL 14.4; ZB 24.9; IOB 13.3; BCW 21; CD 19; PTL 20.9; MTR 11.8; ROSL 17.7; PLB 9.1.

Most of these animals were taken from trees, and all were collected near water. A female collected 17 April 1934 contained two embryos.

Specimens listed above have relatively fine pelage, resembling that of most *Proechimys* in texture, especially on the shoulders and back. Those from the Rio Tapajós (Iroçanga) are marked on the nose, face, and dorsal surface of the tail with chestnut. The lower portions of the cheeks are washed with yellow, the gular region is grayish (not whitish), and blond and black bands of dorsal hairs intergrade. The feet are washed with buff. Enamel patterns of the cheek teeth resemble those of *Makalata*. Specimens from the middle Amazon are more heterogeneous. One specimen from Itacoatiara fits this description, whereas another from that locality is distinctly more spiny (group below).

FIELD NUMBERS—1016 ♀, 1035 ♀ / 1144 ♀, 1148 ♂ / 1539 ♂ / 2117 ♂, 2163 ♀, 2333 ♀ / 1176 ♀.

DISTRIBUTIONAL RECORDS—Codajáz (2), Igarapé do Castanha (2), Itacoatiara, João Pessoa (3), Redempção.

MEASUREMENTS—Codajáz—AGE 2 (6–7) 6.5; TOTL 2 (430–485) 457.5; TAIL 2 (185–230) 207.5; FOOT 2 (40–41) 40.5; GLS 2 (54.6–57.7) 56.15; CIL 2 (47.3–51.3) 49.3; NL 2 (16.4–17.4) 16.9; ZB 29.4; IOB 2 (12.7–14.2) 13.45; BCW 23; CD 20.7; PTL 2 (20.9–23.6) 22.25; MTR 2 (12.5–12.7)

12.6; ROSL 2 (19.5–20.5) 20; PLB 2 (9.2–11) 10.1. **Igarapé do Castanha**—AGE 2 (5–6) 5.5; TOTL 2 (240–438) 339; TAIL 192; FOOT 2 (44–44) 44; GLS 57.8; CIL 2 (49.4–51.3) 50.35; NL 2 (16.7–18) 17.35; ZB 2 (26.6–26.6) 26.6; IOB 2 (13.9–14.6) 14.25; BCW 2 (21.7–21.7) 21.7; CD 20.9; PTL 2 (21.5–22.4) 21.95; MTR 2 (12–12.6) 12.3; ROSL 2 (20.1–21.1) 20.6; PLB 2 (8.2–10.9) 9.55. **Itacoatiara**—AGE 4; TOTL 367; TAIL 171; FOOT 38; GLS 49.2; CIL 42.7; NL 14.9; ZB 24.1; IOB 12.1; BCW 20.4; CD 18.6; PTL 19.5; MTR 11.6; ROSL 17.7; PLB 8.9. **João Pessoa**—AGE 3 (5–8) 6.33; TOTL 3 (248–482) 360; TAIL 2 (125–222) 173.5; FOOT 3 (43–46) 44.33; GLS 2 (52.1–55.6) 53.85; CIL 2 (46.7–47.9) 47.3; NL 3 (15.4–17.6) 16.56; ZB 2 (24.6–27.3) 25.95; IOB 3 (12.1–13.9) 13.06; BCW 22.2; CD 2 (19.5–20.6) 20.05; PTL 3 (20.7–22.4) 21.3; MTR 3 (12.5–12.8) 12.7; ROSL 3 (17.5–20.2) 18.73; PLB 3 (8.6–9.8) 9.13. **Redempção**—AGE 5; TOTL 380; TAIL 145; FOOT 41; GLS ♂; CIL 47; NL 16.1; ZB ♂; IOB 12.9; BCW ♂; CD ♂; PTL 20.9; MTR 13.5; ROSL 18.5; PLB 9.5.

One *Echimys* from Igarapé do Castanha was taken on the ground; the remainder were taken in trees. Climbing rats were first reported from the Rio Juruá by Ihering (1904).

The specimen from Canaçary has hairs that are distinctly more spiny, making a zipperlike noise when a fingernail is drawn transversely across them. The dorsal hairs have distinct blond bands, which produce a strongly flecked appearance. The tail appears shorter and proximally lacks chestnut on its dorsum. The chestnut of the face is reduced and mostly confined to the sides of the rostrum, and the feet are washed with gray.

### **Proechimys goeldii-group**

FIELD NUMBERS—616 ♂, 619 ♀ / 373 ♀, 376 ♂, 7480 ♂, 7487 ♀ / 509 ♂ / 2410 ♂, 2412 ♀ / 54 ♀, 191 ♂, 210 ♂, 276 ♂, 303 ♀, 509 — / 1424 ♀ / 2110 ♂, 2137 ♀, 2239 ♂, 2355 ♂, 2383 ♀ / 2442 ♀, 2467 ♂ / 7378 ♂, 7396 ♂, 7397 ♂ / 1175 ♀.

DISTRIBUTIONAL RECORDS—Casa Nova (2), Aveiros (4), Cameté, Igarapé Grande (2), Iroçanga (6), Itacoatiara, João Pessoa (5), Lago Grande (2), Marai (3), Redempção.

MEASUREMENTS—AGE 28 (6–10) 9.14 [13.87]; TOTL 25 (140–467) 329.08 [24.82]; TAIL 18 (0–227) 138.17 [40.37]; FOOT 25 (40–60) 51.2 [9.63]; GLS 16 (45.47–62.53) 55.75 [9.03]; CIL 22 (37.96–53.63) 46.37 [9.23]; NL 22 (15.84–25.31) 21.65

[11.55]; ZB 24 (23.45–29.1) 26.30 [6.27]; IOB 25 (10.5–13.78) 12 [8.34]; BCW 23 (19.28–22.36) 20.93 [4.21]; CD 22 (15.82–20.61) 18.24 [8.53]; PTL 28 (15.92–23.12) 19.66 [10.92]; MTR 28 (6.92–9.26) 8.49 [6.23]; ROSL 22 (17.03–25.34) 22.17 [10.44]; PLB 28 (5.31–8.78) 7.23 [12.39]. **Adults Only**—AGE 25 (8–10) 9.52; TOTL 23 (140–467) 328.87 [25.89]; TAIL 16 (0–227) 138.19 [42.86]; FOOT 23 (40–60) 51.74 [9.05]; GLS 14 (49.34–62.53) 56.90 [7.26]; CIL 20 (40–53.63) 47.12 [7.86]; NL 19 (18.62–25.31) 22.26 [9.07]; ZB 21 (23.77–29.1) 26.61 [5.67]; IOB 22 (10.75–13.78) 12.14 [7.92]; BCW 20 (19.28–22.36) 21.03 [4.27]; CD 20 (16.18–20.61) 18.45 [7.87]; PTL 25 (16.21–23.12) 20.03 [9.8]; MTR 25 (6.92–9.26) 8.49 [6.52]; ROSL 19 (18.77–25.34) 22.76 [8.03]; PLB 25 (5.31–8.78) 7.36 [11.52].

The baculum from one young specimen (AMO 2355; 7.2 × 2.1 mm) and pelage similarities with the remainder of this series provisionally identify these spiny rats as members of the *goeldii*-group of *Proechimys* (cf. Patton, 1987). Various epithets, whose validity or rank await further taxonomic work, may apply to this material, including *leioprimna* (Cametá), *goeldii* and *hyleae* (Tapajós localities), and probably *steerei* (Juruá localities).

### *Proechimys cuvieri*-group

**FIELD NUMBERS**—2493 ♂ / 2394 ♀, 2400 ♀, 2406 ♀, 2411 ♂ / 2111 ♀, 2150 ♂, 2334 ♂, 2335 ♀, 2354 ♂, 2356 ♀, 2367 ♀, 2385 ♂ / 2468 ♀, 2471 ♂ / 2291 ♂, 2306 ♂.

**DISTRIBUTIONAL RECORDS**—Santo Antônio, Igarapé Grande (4), João Pessoa (8), Lago Grande (2), Igarapé do Gordão (2).

**MEASUREMENTS**—AGE 16 (2–10) 7.56; TOTL 16 (196–390) 326.63 [16.79]; TAIL 15 (75–157) 130.8 [15.44]; FOOT 16 (37–51) 47.63 [7.02]; GLS 12 (48.76–60.77) 53.93 [7.05]; CIL 13 (38.25–47.95) 43.09 [6.95]; NL 13 (17.26–22.63) 20 [8.95]; ZB 14 (23.88–27.48) 25.70 [5.15]; IOB 15 (10.87–13.11) 11.79 [5.99]; BCW 14 (19.58–26.72) 21.05 [8.41]; CD 12 (16.06–19.02) 17.44 [6.06]; PTL 16 (12.22–20.9) 18.02 [12.37]; MTR 16 (6.64–10.1) 8.56 [11.11]; ROSL 14 (13.19–23.79) 20.38 [13.11]; PLB 16 (4.43–8.55) 6.95 [13.99]. **Adults Only**—AGE 9 (8–10) 9.22; TOTL 9 (312–390) 353.33 [8.36]; TAIL 9 (117–157) 137.33 [11.41]; FOOT 9 (47–51) 48.67 [2.91]; GLS 7 (52.55–60.77) 56.2 [5.82]; CIL 7 (41.46–47.95) 44.97 [5.65]; NL 8 (19.39–22.63) 21.03 [6.67]; ZB 8 (25.16–27.48) 26.67 [2.77]; IOB 9 (10.95–13.11) 12.10 [5.93];

BCW 8 (19.58–26.72) 21.65 [10.09]; CD 7 (16.85–19.02) 18.09 [4.65]; PTL 9 (16.82–20.9) 19.23 [7.53]; MTR 9 (8.37–10.1) 9.03 [6.57]; ROSL 8 (19.57–23.79) 21.79 [7.72]; PLB 9 (6.54–8.55) 7.54 [7.68].

The pelage of these animals is blackish on the posterior mid-dorsum, which sometimes extends onto the nape (e.g., 2385). Individual hairs in many specimens (e.g., 2150) are ticked with pale bands near their tips. One specimen (2411) has pelage that is a rich rufous and markedly uniform save for a blackish rump. Identification of these spiny rats as *Proechimys cuvieri* Petter, 1978, is based on an exceptionally broad, spatulate baculum with distal width 92% of its length (cf. Patton, 1987), shown by both 2411 and 2306. The Igarapé Grande records are noteworthy in closing the broad distributional gap between *cuvieri*, distributed in the Guianas and along the Amazon from Perú to its mouth, and another *Proechimys* from Balta on the Río Curanja.

### *Proechimys guyannensis*-group

**FIELD NUMBERS**—7 ♀, 12 ♂.

**DISTRIBUTIONAL RECORDS**—Itapoama (2).

**MEASUREMENTS**—AGE 2 (5–9) 7; TOTL 2 (330–380) 355; TAIL 2 (111–150) 130.5; FOOT 2 (40–49) 44.5; GLS 53.69; CIL 2 (37.28–43.39) 40.33; NL 20.45; ZB 2 (22.47–26.19) 24.33; IOB 2 (10.53–10.89) 10.71; BCW 2 (19.58–21.19) 20.38; CD 2 (15.8–17.36) 16.58; PTL 2 (15.76–18.38) 17.07; MTR 2 (8.59–8.79) 8.69; ROSL 20.99; PLB 2 (5.91–7.27) 6.59. **Adult Only**—AGE 9; TOTL 380; TAIL 150; FOOT 49; GLS 53.69; CIL 43.39; NL 20.45; ZB 26.19; IOB 10.89; BCW 21.19; CD 17.36; PTL 18.38; MTR 8.79; ROSL 20.99; PLB 7.27.

The pelage of these animals is very spiny, resembling but by no means as spiny as the pelage of *Hoplomys*. The baculum of one (AMO 12; 6.2 × 2 mm) resembles illustrations of bacula of the *guyannensis* group in Patton (1987). The Itapoama locality is near the type locality of *boimensis*.

### *Proechimys* sp. A

**FIELD NUMBERS**—515 ♂, 476 ♂, 488 ♂, 515 ♂, 542 ♀, 453 ♂, 462 ♀, 492 ♂, 510 ♂, 517 ♂ / 1146 ♂ / 1430 ♀ / 1580 ♂.

**DISTRIBUTIONAL RECORDS**—Cametá (10), Igarapé do Castanha, Itacoatiara, Lago do Baptista.

MEASUREMENTS—AGE 13 (6–10) 9.23; TOTL 12 (240–400) 315 [16.98]; TAIL 8 (0–150) 106.5 [42.43]; FOOT 12 (42–60) 50.17 [8.95]; GLS 13 (46.41–62.01) 55.23 [9.02]; CIL 12 (36.59–50.03) 44.18 [8.89]; NL 13 (16.46–23.92) 20.69 [11.20]; ZB 13 (22.87–28.69) 25.58 [6.42]; IOB 12 (10.09–13.45) 11.79 [7.49]; BCW 13 (18.3–21.81) 20.46 [4.49]; CD 13 (15.36–20.25) 17.69 [9.21]; PTL 11 (15.82–21.06) 18.52 [8.78]; MTR 13 (7.7–8.88) 8.25 [4.78]; ROSL 13 (17.45–25.04) 21.34 [11.34]; PLB 11 (6.01–8.31) 7.26 [9.93]. **Adults Only**—AGE 12 (9–10) 9.5; TOTL 10 (240–400) 316.5

[18.62]; TAIL 7 (0–150) 104.57 [46.33]; FOOT 10 (45–60) 50.8 [7.97]; GLS 12 (50.06–62.01) 55.96 [7.87]; CIL 11 (41.01–50.03) 44.87 [7.29]; NL 12 (18.41–23.92) 21.05 [9.62]; ZB 12 (22.87–28.69) 25.79 [5.86]; IOB 11 (10.09–13.45) 11.84 [7.69]; BCW 12 (18.3–21.81) 20.56 [4.26]; CD 12 (15.36–20.25) 17.84 [9.04]; PTL 10 (17.05–21.06) 18.79 [7.61]; MTR 12 (7.7–8.88) 8.30 [4.51]; ROSL 12 (18.65–25.04) 21.66 [10.22]; PLB 10 (6.7–8.31) 7.39 [8.42].

These animals differ from *P. goeldii* in having redder, spinier pelage.

## Syntopic Assemblages

### Cochabamba, Bolivia

#### Highlands, 2600–3526 m

Illataco	<i>Oligoryzomys destructor</i> , <i>Akodon subfuscus</i> , <i>Mus musculus</i>
Liriuini	<i>Akodon puer</i> , <i>Oxymycterus paramensis</i> , <i>Phyllotis wolffsohni</i>
Toncoma	<i>Akodon puer</i> , <i>Oxymycterus paramensis</i> , <i>Phyllotis wolffsohni</i> , <i>Phyllotis xanthopygus</i>
Ucho Ucho	<i>Akodon puer</i> , <i>Oxymycterus paramensis</i> , <i>Phyllotis wolffsohni</i> , <i>Phyllotis xanthopygus</i>

#### Yungas, 1850–2300 m

Cuesta Cucho	<i>Oryzomys keaysi</i> , <i>Oligoryzomys destructor</i> , <i>Akodon subfuscus</i>
Locotal	<i>Oryzomys keaysi</i> , <i>Oxymycterus</i> sp. nov. B

### La Paz, Bolivia

#### Highlands, 2647–3700 m

Chilcani	<i>Akodon subfuscus</i>
Huancuni	<i>Akodon subfuscus</i> , <i>Phyllotis osilae</i> , <i>Phyllotis xanthopygus</i>
Sorata	<i>Oligoryzomys destructor</i> , <i>Akodon subfuscus</i> , <i>Mus musculus</i>

#### Yungas, 1740–2100 m

Chulumani	<i>Nectomys squamipes</i> , <i>Akodon dayi</i> , <i>Calomys venustus</i>
Laza	<i>Calomys venustus</i>

### El Beni, Bolivia

#### Lowlands, 175–226 m

El Consuelo	<i>Oecomys mamorae</i> , <i>Calomys callosus</i> , <i>Akodon dayi</i>
-------------	---

Puerto Salinas      *Marmosa murina, Oecomys mamorae*  
Reyes                *Gracilinanus agilis, Oryzomys nitidus*  
Mojos                *Oryzomys nitidus*

## **Pando, Bolivia**

Victoria              *Saccopteryx bilineata, Oligoryzomys microtis, Akodon dayi*

## **Rio Juruá Drainage, Brazil**

### **East Bank**

Lago Grande        *Saccopteryx bilineata, Isothrix bistrata, Proechimys goeldii-group, Proechimys cuvieri-group*  
Santo Antônio      *Peropteryx leucoptera, Noctilio albiventris, Phyllostomus elongatus, Rhinophylla pumilio, Eumops glaucinus, Molossus rufus, Holochilus brasiliensis, Proechimys cuvieri-group*

### **West Bank**

Igarapé do Gordão   *Peropteryx macrotis, Carollia perspicillata, Molossus molossus, Microsciurus flaviventer, Oligoryzomys microtis, Oecomys bicolor, Nectomys squamipes, Holochilus brasiliensis, Rattus rattus, Echimys armatus, Proechimys cuvieri-group*  
Igarapé Grande      *Marmosa murina, Gracilinanus emiliae, Saccopteryx bilineata, Cormura brevirostris, Noctilio albiventris, Myotis nigricans, Microsciurus flaviventer, Oligoryzomys microtis, Holochilus brasiliensis, Proechimys goeldii-group, Proechimys cuvieri-group*  
João Pessoa         *Marmosa murina, Saccopteryx bilineata, Saccopteryx leptura, Noctilio albiventris, Macrophyllum macrophyllum, Phyllostomus hastatus, Glossophaga soricina, Carollia perspicillata, Eumops perotis, Microsciurus flaviventer, Sciurus aestuans, Oryzomys capito, Oligoryzomys microtis, Oecomys bicolor, Nectomys squamipes, Holochilus brasiliensis, Rattus rattus, Isothrix bistrata, Echimys armatus, Proechimys goeldii-group, Proechimys cuvieri-group*

## **Rio Purus Drainage, Brazil**

### **East Bank**

Igarapé do Castanha   *Saccopteryx bilineata, Oecomys trinitatis, Echimys armatus, Proechimys sp. A*  
Redempção         *Rhynchonycteris naso, Echimys armatus, Proechimys goeldii-group*  
Labrea                *Isothrix bistrata*

## West Bank

Itaboca	<i>Eumops auripendulus</i> , <i>Eumops glaucinus</i> , <i>Oecomys trinitatis</i>
Jaburú	<i>Microsciurus flaviventer</i>

## Rios Solimões–Amazonas, Brazil

### North Bank

Codajáz	<i>Micoureus cinereus</i> , <i>Marmosa murina</i> , <i>Gracilinanus emiliae</i> , <i>Saccopteryx bilineata</i> , <i>Sturnira tildae</i> , <i>Uroderma bilobatum</i> , <i>Dermanura anderseni</i> , <i>Artibeus lituratus</i> , <i>Ametrida centurio</i> , <i>Thyroptera tricolor</i> , <i>Microsciurus flaviventer</i> , <i>Oligoryzomys</i> cf. <i>fulvescens</i> , <i>Oecomys trinitatis</i> , <i>Echimys armatus</i>
Manaus	<i>Koopmania concolor</i> , <i>Molossus molossus</i> , <i>Sciurus aestuans</i>
Igarapé Anibá	<i>Noctilio leporinus</i> , <i>Tonatia sylvicola</i> , <i>Desmodus rotundus</i> , <i>Myotis simus</i> , <i>Sciurus aestuans</i>
Itacoatiara	<i>Caluromys philander</i> , <i>Marmosa murina</i> , <i>Saccopteryx bilineata</i> , <i>Peropteryx leucoptera</i> , <i>Noctilio albiventris</i> , <i>Phyllostomus hastatus</i> , <i>Carollia perspicillata</i> , <i>Eptesicus brasiliensis</i> , <i>Cynomops planirostris</i> , <i>Molossus rufus</i> , <i>Sciurus aestuans</i> , <i>Echimys armatus</i> , <i>Proechimys goeldii</i> -group
Lago do Canaçary	<i>Noctilio leporinus</i> , <i>Sciurus aestuans</i> , <i>Rattus rattus</i> , <i>Echimys armatus</i>

### South Bank

Lago do Baptista	<i>Saccopteryx bilineata</i> , <i>Saccopteryx leptura</i> , <i>Peropteryx leucoptera</i> , <i>Noctilio albiventris</i> , <i>Noctilio leporinus</i> , <i>Carollia brevicauda</i> , <i>Carollia perspicillata</i> , <i>Uroderma bilobatum</i> , <i>Artibeus jamaicensis</i> , <i>Myotis albescens</i> , <i>Sciurus aestuans</i> , <i>Proechimys</i> sp. A
Lago Tapayuna	<i>Monodelphis emiliae</i> , <i>Noctilio albiventris</i> , <i>Eumops glaucinus</i> , <i>Molossus rufus</i> , <i>Sciurus aestuans</i> , <i>Oligoryzomys microtis</i>

## Rio Tapajós, Brazil

### West Bank

Casa Nova	<i>Marmosa murina</i> , <i>Isothrix pagurus</i> , <i>Proechimys goeldii</i> -group
Patinga	<i>Uroderma bilobatum</i> , <i>Sciurillus pusillus</i> , <i>Sciurus aestuans</i> , <i>Oryzomys capito</i>

### East Bank

Aveiros	<i>Rhynchonycteris naso</i> , <i>Saccopteryx leptura</i> , <i>Noctilio albiventris</i> , <i>Micronycteris megalotis</i> , <i>Glossophaga soricina</i> , <i>Carollia brevicauda</i> , <i>Carollia perspicillata</i> , <i>Thyroptera discifera</i> , <i>Myotis albescens</i> , <i>Molossus rufus</i> , <i>Sciurus aestuans</i> , <i>Oecomys trinitatis</i> , <i>Rhipidomys mastacalis</i> , <i>Proechimys goeldii</i> -group
Iroçanga	<i>Marmosa murina</i> , <i>Saccopteryx bilineata</i> , <i>Saccopteryx leptura</i> , <i>Noctilio leporinus</i> , <i>Tonatia</i> sp. nov., <i>Phyllostomus hastatus</i> , <i>Choeroniscus minor</i> , <i>Carollia perspicillata</i> , <i>Uroderma bilobatum</i> , <i>Dermanura gnomus</i> , <i>Desmodus</i>

	<i>rotundus</i> , <i>Myotis simus</i> , <i>Eumops auripendulus</i> , <i>Molossus molossus</i> , <i>Molossus rufus</i> , <i>Sciurus aestuans</i> , <i>Oecomys bicolor</i> , <i>Mesomys hispidus</i> , <i>Lonchothrix emiliae</i> , <i>Isothrix pagurus</i> , <i>Echimys armatus</i> , <i>Proechimys goeldii</i> -group
Itapoama	<i>Marmosa murina</i> , <i>Rhynchonycteris naso</i> , <i>Noctilio albiventris</i> , <i>Phyllostomus hastatus</i> , <i>Sciurus aestuans</i> , <i>Oecomys trinitatis</i> , <i>Nectomys squamipes amazonicus</i> , <i>Proechimys guyannensis</i> -group
Marai	<i>Monodelphis breviceaudata</i> , <i>Sciurus aestuans</i> , <i>Oecomys trinitatis</i> , <i>Nectomys squamipes</i> , <i>Rhipidomys mastacalis</i> , <i>Oxymycterus</i> sp. nov. A, <i>Proechimys goeldii</i> -group
Prainha	<i>Noctilio albiventris</i> , <i>Phyllostomus elongatus</i> , <i>Carollia perspicillata</i> , <i>Vampyressa macconnelli</i> , <i>Furipterus horrens</i> , <i>Molossus molossus</i> , <i>Molossus rufus</i> , <i>Sciurus aestuans</i> , <i>Nectomys squamipes</i>
Santarém	<i>Noctilio albiventris</i> , <i>Ametrida centurio</i> , <i>Myotis simus</i> , <i>Myotis albescens</i> , <i>Mus musculus</i>

### North of Mouth on Rio Amazonas

Patauí	<i>Noctilio albiventris</i> , <i>Molossus rufus</i>
Ilha da Urucurituba	<i>Rhynchonycteris naso</i> , <i>Saccopteryx bilineata</i> , <i>Noctilio albiventris</i> , <i>Lonchorhina aurita</i> , <i>Phyllostomus elongatus</i> , <i>Trachops cirrhosus</i> , <i>Carollia castanea</i> , <i>Carollia perspicillata</i> , <i>Artibeus obscurus</i> , <i>Eptesicus furinalis</i> , <i>Myotis albescens</i> , <i>Lasiurus ega</i>

### Rio Tocantins, Brazil

Cametá	<i>Caluromys philander</i> , <i>Monodelphis breviceaudata</i> , <i>Micoureus cinereus</i> , <i>Sciurus aestuans</i> , <i>Rattus rattus</i> , <i>Proechimys goeldii</i> -group, <i>Proechimys</i> sp. A
--------	--

### Acknowledgments

I greatly appreciate the willingness of friends and colleagues to share their expertise, experience, and unpublished manuscripts on the taxonomy and distribution of various groups. These informal collaborators included S. Anderson, G. K. Creighton, J. L. Eger, G. G. Musser, P. Myers, N. Olds, J. L. Patton, S. L. Williams, and R. S. Voss. A. L. Gardner introduced me to many of these taxa while we worked together on the Rio Ji-Paraná; he also offered useful suggestions on the manuscript, as did P. Myers and R. H. Pine. M. A. Traylor gave me access to his enormously valuable Brazilian gazetteer while it was in preparation. Curators of the American Museum of Natural History (S. Anderson and G. G. Musser), U.S. National Museum of Natural History (M. D. Carleton), and Museu de Zoologia, Universidade de São Paulo (P. E.

Vanzolini and R. Spieker) made the vast resources of their respective collections available for this study. Thanks are also due Dr. B. Svenson, Stockholm, for authorizing the loan of *Olalla* specimens and for extending the loan on two occasions. M. A. Rogers determined ages of animals and measured skulls, supported by funds from the Ellen Thorne Smith Bird and Mammal Study Center, and M. Battles took forearm measurements and confirmed certain cranial and skin measurements. Finally, I feel a special debt to Philip Hershkovitz for his constant encouragement, interest, and boundless enthusiasm for the study of Neotropical mammals—our impromptu conversations, taken up in collection ranges, at the mailboxes, and on stairways throughout the division, have touched on a host of groups and have been a source of great stimulation and pleasure over the years that this work has been in progress.

## Literature Cited

- ALLEN, J. A. 1911. Mammals from Venezuela collected by Mr. M. A. Carriker, Jr., 1909–1911. *Bulletin of the American Museum of Natural History*, **30**: 239–273.
- . 1916. New mammals collected on the Roosevelt Brazilian Expedition. *Bulletin of the American Museum of Natural History*, **35**(30): 559–610.
- ANDERSON, S., K. F. KOOPMAN, AND G. K. CREIGHTON. 1982. Bats of Bolivia: An annotated checklist. *American Museum Novitates*, **2750**: 1–24.
- ANTHONY, H. E., AND G. H. H. TATE. 1935. Notes on South American Mammalia. No. 1. *Sciurillus*. *American Museum Novitates*, **780**: 1–13.
- AVILA PIRES, F. D. DE. 1958. Mamíferos colecionados nos arredores de Belém do Pará. *Boletim do Museu Paraense Emilio Goeldi, nova série, Zoologia*, no. **19**: 1–9.
- . 1964. Mamíferos colecionados na região do Rio Negro (Amazonas, Brasil). *Boletim do Museu Paraense Emilio Goeldi, nova série, Zoologia*, no. **42**: 1–23.
- BAKER, R. J., H. H. GENOWAYS, W. J. BLEIER, AND J. W. WARNER. 1973. Cytotypes and morphometrics of two phyllostomatid bats, *Micronycteris hirsuta* and *Vampyressa pusilla*. *Occasional Papers, The Museum, Texas Tech University*, **17**: 1–10.
- BRADBURY, J. W., AND L. H. EMMONS. 1974. Social organization of some Trinidad bats. I. Emballonuridae. *Zeitschrift für Tierpsychologie*, **36**: 137–183.
- CABRERA, A. 1958–1961. Catalogo de los mamíferos de America del Sur. *Revista del Museo Argentino de Ciencias Naturales "Bernardino Rivadavia," Ciencias Zoológicas*, **4**(1–2), 732 pp.
- CARLETON, M. D., AND G. G. MUSSER. 1989. Systematic studies of oryzomyine rodents (Muridae, Sigmodontinae): A synopsis of *Microroryzomys*. *Bulletin of the American Museum of Natural History*, **191**: 1–83.
- CARVALHO, C. T. DE. 1960. Sobre alguns mamíferos do sudeste do Pará. *Arquivos de Zoologia do Estado de São Paulo*, **11**(5): 121–132.
- CREIGHTON, G. K. In press. [Chapters on] *Marmosa*, *Micoureus*, *Gracilinanus*. In Gardner, A. L., S. Anderson, and J. L. Patton, eds., *Mammals of South America*, vol. 1. University of Chicago Press, Chicago.
- CUNHA VIEIRA, C. O. DA. 1942. Ensaio monográfico sobre os quirópteros do Brasil. *Arquivos de Zoologia do Estado de São Paulo*, **3**(8): 219–471.
- DAVIS, D. E. 1947. Notes on the life histories of some Brazilian mammals. *Boletim do Museu Nacional, Rio de Janeiro, nova série, Zoologia*, **76**: 1–8.
- DAVIS, W. B. 1968. Review of the genus *Uroderma* (Chiroptera). *Journal of Mammalogy*, **49**: 676–698.
- . 1973. Geographic variation in the fishing bat, *Noctilio leporinus*. *Journal of Mammalogy*, **54**: 862–874.
- . 1976. Geographic variation in the lesser noctilio, *Noctilio albiventris* (Chiroptera). *Journal of Mammalogy*, **57**: 687–707.
- DAVIS, W. B., AND D. C. CARTER. 1978. A review of the round-eared bats of the *Tonatia silvicola* complex, with the descriptions of three new taxa. *Occasional Papers, The Museum, Texas Tech University*, no. **53**: 1–12.
- D'ORBIGNY, A. 1835. Voyage dans l'Amérique Méridionale, 4th vol., 2nd part: Mammifères. Chez V. Levrault, Paris [plates].
- D'ORBIGNY, A., AND P. GERVAIS. 1847. Mammifères, vol. 4, pt. 2. In d'Orbigny, A., Voyage dans l'Amérique Méridionale [le Brésil, la République orientale de Uruguay, la République Argentine, la Patagonie, la République du Chili, la République de Bolivie, la République du Pérou] exécuté pendant les années 1826, 1827, 1828, 1829, 1830, 1831, 1832, 1833. Pitois-Levrault et cie, Paris, Strasbourg, 9 vols.
- EGER, J. L. 1977. Systematics of the genus *Eumops* (Chiroptera: Molossidae). *Life Science Contributions, Royal Ontario Museum*, no. **110**: 1–69.
- EMMONS, L. H. 1988. Replacement name for a genus of South American rodent (Echimyidae). *Journal of Mammalogy*, **69**: 421.
- . 1990. Neotropical rainforest mammals: A field guide. University of Chicago Press, Chicago, 281 pp.
- FEITO, R. J., L. A. GONZÁLEZ, AND R. MONDION. 1981. Determination of age and age classes of *Akodon olivaceus* in southern Chile. *Studies in Neotropical Fauna and Environment*, **16**: 201–207.
- FONSECA, G. A. B. DA, AND M. C. M. KIERRULFF. 1988. Biology and natural history of Brazilian Atlantic Forest small mammals. *Bulletin of the Florida State Museum, Biological Sciences*, **34**: 99–152.
- FORNES, A. 1972. *Myotis (Hesperomyotis) simus* Thomas, nueva especie para la Argentina. *Neotropica*, **18**: 87–89.
- GARDNER, A. L., AND G. K. CREIGHTON. 1989. A new generic name for Tate's (1933) *microtarsus* group of South American mouse opossums (Marsupialia: Didelphidae). *Proceedings of the Biological Society of Washington*, **102**: 3–7.
- GARDNER, A. L., AND J. L. PATTON. 1976. Karyotypic variation in oryzomyine rodents (Cricetinae) with comments on chromosomal evolution in the Neotropical cricetine complex. *Occasional Papers of the Museum of Zoology, Louisiana State University*, **49**: 1–48.
- GOODWIN, G. G., AND A. M. GREENHALL. 1961. A review of the bats of Trinidad and Tobago: Descriptions, rabies infection, and ecology. *Bulletin of the American Museum of Natural History*, **122**(3): 187–302.
- GRISCOM, L., AND J. C. GREENWAY, JR. 1941. Birds of Lower Amazonia. *Bulletin of the Museum of Comparative Zoology*, **88**(3): 81–344.
- GYLDESTOLPE, N. 1941a. Preliminary descriptions of some new birds from the Brazilian Amazonas. *Arkiv för Zoologi*, **33B**(12): 1–10.
- . 1941b. Preliminary diagnoses of some new birds from Bolivia. *Arkiv för Zoologi*, **33B**(13): 1–10.
- . 1945a. The bird fauna of Rio Juruá in western Brazil. *Kungliga Svenska Vetenskapsakademiens Handlingar, Series 3*, **22**(3): 1–338 + map.
- . 1945b. A contribution to the ornithology of northern Bolivia. *Kungliga Svenska Vetenskapsakademiens Handlingar, Series 3*, **23**(1): 1–300 + map.



- . 1951. The ornithology of the Rio Purús [sic] region in western Brazil. *Arkiv för Zoologi, new series*, 2(1): 1–320 + map.
- HALL, E. R. 1946. *Mammals of Nevada*. University of California Press, Berkeley, 710 pp.
- HANDLEY, C. O., JR. 1976. *Mammals of the Smithsonian Venezuelan Project*. Brigham Young University Science Bulletin, Biological Series, 20(5): 1–91.
- . 1987. New species of mammals from northern South America: Fruit-eating bats, genus *Artibeus* Leach, pp. 163–172. In Patterson, B. D., and R. M. Timm, eds., *Studies in Neotropical Mammalogy: Essays in Honor of Philip Hershkovitz*. Fieldiana: Zoology, new series, 39.
- . 1989. The *Artibeus* of Gray 1838. *Advances in Neotropical Mammalogy*, 1989: 443–468.
- HARRISON, D. L. 1975. *Macrophyllum macrophyllum*. *Mammalian Species*, 62: 1–3.
- HERSHKOVITZ, P. 1944. A systematic review of the Neotropical water rats of the genus *Nectomys* (Cricetinae). *Miscellaneous Publications, Museum of Zoology, University of Michigan*, 58: 1–88.
- . 1962. Evolution of Neotropical cricetine rodents (Muridae), with special reference to the phyllostine group. *Fieldiana: Zoology*, 46: 1–524.
- HONACKI, J. H., K. E. KINMAN, AND J. W. KOEPL, EDs. 1982. *Mammal Species of the World*. Allen Press and Association of Systematics Collections, Lawrence, Kansas, 694 pp.
- HOOD, C. S., AND J. K. JONES, JR. 1984. *Noctilio leporinus*. *Mammalian Species*, 216: 1–7.
- HOOD, C. S., AND J. PITOCHELLI. 1983. *Noctilio albigentris*. *Mammalian Species*, 197: 1–5.
- ICZN. 1985. International Code of Zoological Nomenclature, 3rd ed. International Trust for Zoological Nomenclature in association with the British Museum (Natural History), London, 338 pp.
- IHERING, H. VON. 1904. O Rio Juruá. *Revista do Museu Paulista, São Paulo*, 6: 385–460.
- JONES, J. K., JR., AND D. C. CARTER. 1976. Annotated checklist, with keys to subfamilies and genera, pp. 7–38. In Baker, R. J., J. K. Jones, Jr., and D. C. Carter, eds., *Biology of bats of the New World family Phyllostomatidae, part I*. Special Publications of the Museum, Texas Tech University, 10.
- KOOPMAN, K. F. 1978. Zoogeography of Peruvian bats with special emphasis on the role of the Andes. *American Museum Novitates*, 2651: 1–33.
- LAVAL, R. K. 1973. A revision of the Neotropical bats of the genus *Myotis*. *Natural History Museum of Los Angeles County, Science Bulletin*, 15: 1–54.
- LINARES, O. 1986. *Murciélagos de Venezuela*. Cuadernos Lagoven: Departamento de Relaciones Públicas de Lagoven, Filial de Petróleos de Venezuela, Caracas, 122 pp.
- LINARES, O. J., AND J. OJASTI. 1971. Una nueva especie de murciélago del género *Lonchorhina* (Chiroptera: Phyllostomidae) del sur de Venezuela. *Notas de las Comunicaciones Científicas, Contribuciones Ocasionales del Museo de Historia Natural La Salle, Serie Zoológica*, 36: 1–8.
- MALA, V., Y. YONENAGA-YASUDA, T. R. O. FREITAS, S. KASAHARA, M. SUÑE-MATTEVI, L. F. OLIVEIRA, M. A. GALINDO, AND I. J. SBALQUIERO. 1984. Supernumerary chromosomes, Robertsonian rearrangement and variability of the sex chromosomes in *Nectomys squamipes* (Cricetidae, Rodentia). *Genetica*, 63: 121–128.
- MASSOIA, E. 1980. El estado sistemático de cuatro especies de cricétidos sudamericanos y comentarios sobre otras especies congenericas. *Ameghiniana*, 17: 280–287.
- MILES, M. A., A. A. DE SOUZA, AND M. M. POVOA. 1981. Mammal tracking and nest location in Brazilian forest with an improved spool-and-line device. *Journal of Zoology, London*, 195: 331–347.
- MYERS, P. 1989. A preliminary revision of the *varius* group of *Akodon* (*A. dayi, dolores, molinae, neocenus, simulator, toba, and varius*). *Advances in Neotropical Mammalogy*, 1989: 5–54.
- MYERS, P., J. L. PATTON, AND M. F. SMITH. 1990. A review of the *boliviensis* group of *Akodon* (Muridae: Sigmodontinae), with emphasis on Peru and Bolivia. *Miscellaneous Publications, Museum of Zoology, University of Michigan*, no. 177: 1–104.
- MYERS, P., AND R. M. WETZEL. 1979. New records of mammals from Paraguay. *Journal of Mammalogy*, 60: 638–641.
- . 1983. Systematics and zoogeography of the bats of the Chaco Boreal. *Miscellaneous Publications, Museum of Zoology, University of Michigan*, 165: 1–59.
- MYERS, P., R. WHITE, AND J. STALLINGS. 1983. Additional records of bats from Paraguay. *Journal of Mammalogy*, 64: 143–145.
- NACHMAN, M. W., AND P. MYERS. 1989. Exceptional chromosomal mutations in a rodent population are not strongly underdominant. *Proceedings of the National Academy of Science, U.S.A.*, 86: 6666–6670.
- OLALLA, A. M. 1935. El género *Sciurillus* representado en la amazonia y algunas observaciones sobre el mismo. *Revista do Museu Paulista, São Paulo*, 19: 425–430.
- . 1937. I. Um viaje a pesquisas zoológicas hacia el Rio Jurúa [sic], Estado del Amazonas, Brasil—1936. II. Notas de campo: Observaciones biológicas. *Revista do Museu Paulista, São Paulo*, 23: 235–297.
- OSGOOD, W. H. 1915. New mammals from Brazil and Peru. *Field Museum of Natural History, Zoological Series*, 10(13): 187–198.
- . 1944. Nine new South American rodents. *Field Museum of Natural History, Zoological Series*, 29(13): 191–204.
- OWEN, R. D. 1987. Phylogenetic analyses of the bat subfamily Stenodermatinae (Mammalia: Chiroptera). *Special Publications, The Museum, Texas Tech University*, 26: 1–65.
- . 1991. The systematic status of *Dermanura concolor* (Peters, 1865) (Chiroptera: Phyllostomidae), with description of a new genus, pp. 18–25. In Griffiths, T. A., and D. Klingener, eds., *Contributions to mammalogy in honor of Karl F. Koopman*. *Bulletin of the American Museum of Natural History*, 206.
- PATTON, J. L. 1987. Species groups of spiny rats Genus *Proechimys* (Rodentia: Echimyidae), pp. 305–345. In Patterson, B. D., and R. M. Timm, eds., *Studies in*

- Neotropical mammalogy: Essays in honor of Philip Hershkovitz. *Fieldiana: Zoology*, new series, **39**.
- PATTON, J. L., AND L. H. EMMONS. 1985. A review of the genus *Isothrix* (Rodentia, Echimyidae). *American Museum Novitates*, **2817**: 1-14.
- PATTON, J. L., AND M. A. ROGERS. 1983. Systematic implications of non-geographic variation in the spiny rat genus *Proechimys*. *Zeitschrift für Säugetierkunde*, **48**: 363-370.
- PAYNTER, R. A., JR., AND M. A. TRAYLOR, JR. 1975. Ornithological gazetteer of Bolivia. Harvard College, Cambridge, Massachusetts, 80 pp. + map.
- . 1991. In manuscript. Ornithological gazetteer of Brazil. Harvard College, Cambridge, Massachusetts, 780 pp. + 2 maps.
- PEARSON, O. P. 1958. A taxonomic revision of the rodent genus *Phyllotis*. University of California Publications in Zoology, **56**(4): 391-496.
- PINE, R. H. 1972. The bats of the genus *Carollia*. Texas A&M University Press, Texas Agricultural Experiment Station Technical Monograph **8**, College Station, Texas, 125 pp.
- PINE, R. H., AND C. O. HANDLEY, JR. 1984. A review of the Amazonian short-tailed opossum *Monodelphis emiliae* (Thomas). *Mammalia*, **48**: 239-245.
- REIS, N. R. DOS, AND A. L. PERACCHI. 1987. Quirópteros da região de Manaus, Amazonas, Brasil (*Mammalia, Chiroptera*). *Boletim do Museu Paraense Emílio Goeldi, Series Zoologia*, **3**: 161-182.
- REIS, N. R. DOS, AND H. O. R. SCHUBART. 1979. Notas preliminares sobre os morcegos do Parque Nacional da Amazônia (Médio Tapajós). *Manaus*, **9**(3): 507-515.
- RYLANDS, A. B. 1990. Priority areas for conservation in the Amazon. *Trends in Ecology & Evolution*, **5**: 240-241.
- STALLINGS, J. R. 1988. Small mammal inventories in an eastern Brazilian park. *Bulletin of the Florida State Museum, Biological Sciences*, **34**: 153-200.
- TADDEI, V. A. 1983. Morcegos. Algumas considerações sistemáticas e biológicas. *Boletim técnico, Coordenadoria de Assistência Técnica Integral, Campinas*, **172**: 1-31.
- . 1988. Morcegos: Aspectos ecológicos, econômicos e médico-sanitários, com ênfase para o estado de São Paulo. *Zoo Intertropica (Instituto de Biociências, Letras e Ciências Exatas, Universidade Estadual Paulista "Júlio de Mesquita Filho," São José do Rio Preto)*, **12**: 1-37.
- TADDEI, V. A., AND N. R. DOS REIS. 1980. Notas sobre alguns morcegos da ilha de Maracá, Território Federal de Roraima (*Mammalia, Chiroptera*). *Acta Amazonica*, **10**(2): 363-368.
- TADDEI, V. A., R. B. DE SEIXAS, AND A. L. DIAS. 1986. Noctilionidae (*Mammalia, Chiroptera*) do sudeste brasileiro. *Ciência e Cultura*, **38**(5): 904-916.
- TATE, G. H. H. 1933. A systematic revision of the marsupial genus *Marmosa*, with a discussion of the adaptive radiation of the murine opossums (*Marmosa*). *Bulletin of the American Museum of Natural History*, **66**: 1-250.
- . 1939. Mammals of the Guiana region. *Bulletin of the American Museum of Natural History*, **76**: 151-229.
- THOMAS, O. 1901. On a collection of bats from Para. *Annals & Magazine of Natural History, series 7*, **8**: 189-193.
- . 1911. Three new mammals from the Lower Amazons. *Annals & Magazine of Natural History, series 8*, **7**: 606-609.
- . 1924. On a collection of mammals made by Mr. Latham Rutter in the Peruvian Amazons. *Annals & Magazine of Natural History, series 9*, **13**: 530-538.
- WALKER, L. L., A. E. SPOTORNO, AND J. ARRAU. 1984. Cytogenetic and reproductive studies of two nominal subspecies of *Phyllotis darwini* and their experimental hybrids. *Journal of Mammalogy*, **65**: 220-230.
- WILLIAMS, S. L., AND H. H. GENOWAYS. 1980. Results of the Alcoa Foundation-Suriname Expeditions. II. Additional records of bats (*Mammalia: Chiroptera*) from Suriname. *Annals of the Carnegie Museum*, **49**: 213-236.
- WILSON, D. E. 1978. Thyroptera discifera. *Mammalian Species*, **104**: 1-3.
- WILSON, D. E., AND J. S. FINDLEY. 1977. Thyroptera tricolor. *Mammalian Species*, **71**: 1-3.